University of Pécs
Medical School

GENERAL MEDICINE
Major

STUDY PROGRAM
2015/2016

Subjects of the
Basic module

(obligatory subjects and
criterion requirements)
### 1st semester

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<td>OAA-BI1</td>
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<td>OAA-ORK</td>
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<td>OAA-AA1</td>
<td>Anatomy 1</td>
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<td>OAA-AED</td>
<td>Public Health 2 (General Epidemiology and Demography)</td>
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<td>OAA-MB2</td>
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<td>OAA-SF1</td>
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<td>OAR-API</td>
<td>Nursing Skills Theory - Hospital Care</td>
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<tr>
<td>OAR-OKG</td>
<td>Summer Practice in Medical Communication Skills</td>
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### 3rd semester

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<td>OAA-AA2</td>
<td>Anatomy 2</td>
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<td>OAA-BKA</td>
<td>Biochemistry</td>
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<td>OAA-EL1</td>
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<td>OAA-HUG</td>
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<td>OAA-SF2</td>
<td>Histology and Embryology 2</td>
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### 4th semester

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<td>OAA-EL2</td>
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<td>OAA-IMM</td>
<td>Basic Immunology</td>
<td>79</td>
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<tr>
<td>OAA-NEA</td>
<td>Anatomy, Histology, Embryology and Neuroanatomy</td>
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<td>OAA-OBa</td>
<td>Medical Biochemistry</td>
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<tr>
<td>OAA-SZo</td>
<td>Behavioral Science 3 (Medical Sociology)</td>
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<td>OAR-HUF-O</td>
<td>Final Examination in Medical Hungarian - oral</td>
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<td>ATT1-2-3-4</td>
<td>Physical Education 1-2-3-4</td>
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OAA-ANT  Behavioral Science 1 (Medical Anthropology)

Course director: DR. ÁRPÁD CSATHÓ, associate professor
Department of Behavioural Sciences

1 credit • semester exam • Basic module • autumn semester • recommended semester: 1

Number of hours/semester:  14 lectures + 0 practices + 0 seminars = total of 14 hours
Course headcount limitations (min.-max.):  5 – 300
Prerequisites:  no prerequisites

Topic

Medical Anthropology can shortly be described as a subfield of anthropology that draws upon philosophical, cultural, and biological anthropology to better understand those factors which influence human health and well-being. Within this scope, there are many different theoretical approaches which have contributed to the development of medical anthropology. At least three of these have to receive special mention. First, the ecological approach underlying the interaction between individuals and the biological/cultural environments forms an immediately useful conceptual framework. Second, theory of evolution and adaptation biology, basis of all biological sciences, provides the necessary temporal landscape. Finally, links with the cognitive sciences gives a better insight into the cognitive parameters of illness. With a special focus on the first, the course of medical anthropology covers all relevant approaches of the modern medical anthropology.

Conditions for acceptance of the semester

Attending the lectures.

Mid-term exams

Making up for missed classes

According to the Code of Studies and Examinations

Reading material

- Obligatory literature
  Lecture notes

- Literature developed by the Department
  CooSpace

- Notes

- Recommended literature
  Donald Joralemon: Exploring Medical Anthropology, Allyn and Bacon, 1999
  Tony McMichael: Human Frontiers, Environments and Disease, Cambridge, Univ. Press, 2001

Lectures

1  The subfields of Anthropology. The discipline of medical anthropology
   Dr. Vereczkei Lajos
2  The levels of human thinking, the essence of human
   Dr. Vereczkei Lajos
3  Rationality, the levels of human thinking
   Dr. Szolcsányi Tibor
4  The concept of adaptation and acclimatization. Basic concepts in Ecology
   Dr. Csathó Árpád
5  Urban ecology: The effects of urbanization on health
   Dr. Csathó Árpád
6  Human nutritional evolution
   Dr. Csathó Árpád
7  Pharmacological anthropology: The total drug effect
   Dr. Csathó Árpád
8  Placebo-nocebo effects
   Dr. Csathó Árpád
9  Pain perception, and its bio-cultural variability
   Dr. Csathó Árpád
10 The anthropology of empathy
    Dr. Csathó Árpád
11 Stress as a bio-cultural interaction
    Dr. Csathó Árpád
12 Behavioural science models for human addiction  
   Dr. Csathó Árpád

13 Basic concepts of Demography  
   Dr. Csathó Árpád

14 The anthropology of human aging  
   Dr. Csathó Árpád

Practices

Seminars

Exam topics/questions

Participants
OAA-BI1 Biophysics 1

Course director: DR. GÁBOR HILD, associate professor
Department of Biophysics

4 credit • semester exam • Basic module • autumn semester • recommended semester: 1

Number of hours/semester: 28 lectures + 28 practices + 0 seminars = total of 56 hours
Course headcount limitations (min.-max.): 5 –
Prerequisites: no prerequisites

Topic
The course addresses the physical basis of the structure and function of biological systems. The main topics include atomic and nuclear physics, thermodynamics, transport processes, molecular and supramolecular systems, bioelectric phenomena, and biological motion.

Conditions for acceptance of the semester
Completion and proper documentation of each laboratory practice and approval thereof by the course instructor. Maximum 3 absences from practices. Students are not allowed to be late from the practicals. Being late counts as an absence. During the semester the students write mid-term tests. Based on the results the students can be exempted from some parts of the colloquium.

Mid-term exams
Making up for missed classes
Missed practices can be made up during make-up opportunities provided by the department. During each make-up lab, only one missed practice can be executed.

Reading material
- Obligatory literature
- Literature developed by the Department
  1. Damjanovich Sándor, Fidy Judit, Szöllősi János (eds.): Medical Biophysics, Medicina, Budapest, 2009
  2. Biophysics Laboratory Manual, Pécs University Press, Pécs
  3. Online materials on departmental website (http://biofizika.aok.pte.hu)
- Notes
- Recommended literature

Lectures
1 Introduction to Biophysics
   Dr. Grama László
2 Electromagnetic radiation, Electromagnetic spectrum
   Dr. Grama László
3 Foundations of quantum physics
   Dr. Grama László
4 Structure of the atom
   Dr. Grama László
5 Quantum numbers. Spin
   Dr. Grama László
6 Molecular orbitals. Singulet and triplet state
   Dr. Grama László
7 X-ray
   Dr. Grama László
8 X-ray diffraction
   Dr. Grama László
9 Laser
   Dr. Grama László
10 Structure of the atomic nucleus. Radioactivity
    Dr. Grama László
11 Interaction of radioactive radiation with matter
    Dr. Grama László
12 Biological effects of radioactive radiation
    Dr. Grama László
13 Foundations of thermodynamics
    Dr. Lukács András Szilárd
14 Laws of thermodynamics  
Dr. Lukács András Szilárd
15 Thermodynamic potentials  
Dr. Lukács András Szilárd
16 Diffusion  
Dr. Szabó-Meleg Edina
17 Osmosis  
Dr. Szabó-Meleg Edina
18 Fluid flow  
Dr. Grama László
19 Biophysics of circulation. Cardiac biophysics  
Dr. Hild Gábor
20 Protein structure and folding  
Dr. Hild Gábor
21 The cell membrane. Resting potential  
Dr. Hild Gábor
22 Sensory receptors, action potential  
Dr. Hild Gábor
23 Vision  
Dr. Hild Gábor
24 Hearing  
Dr. Hild Gábor
25 Cytoskeleton  
Dr. Hild Gábor
26 Motor proteins, cell motility  
Dr. Hild Gábor
27 Structure and mechanics of striated muscle  
Dr. Bugyi Beáta
28 Molecular basis of muscle function and contraction regulation  
Dr. Bugyi Beáta

Practices
1 Introduction. Laboratory safety rules
2 Introduction. Laboratory safety rules
3 Direct current measurements
4 Direct current measurements
5 Alternative current measurements
6 Alternative current measurements
8 Electric conductivity. Refractometry
9 Electric conductivity. Refractometry
10 Spectroscopy and spectrophotometry
11 Spectroscopy and spectrophotometry
12 Polarimetry
13 Polarimetry
14 Make-up lab, seminar
15 Make-up lab, seminar
16 Viscosity of fluids
17 Viscosity of fluids
18 Surface tension
19 Surface tension
20 Adsorption and swelling
21 Adsorption and swelling
22 Centrifugation
23 Centrifugation
24 Electrophoresis
25 Electrophoresis
Seminars

Exam topics/questions
Can be found on the departmental website: http://biofizika.aok.pte.hu

Participants

Czimbalek Lívia Mária (CZLAAA.T.JPTE), Dr. Bódis Emőke (BOEAD.T.JPTE), Dr. Bugyi Beáta (BUBEAB.T.JPTE), Dr. Grama László (GRLHAAO.PTE), Dr. Hild Gábor (HIGMAAO.PTE), Dr. Kenyeli András Miklós (KEAFACO.PTE), Dr. Lukács András Szilárd (LUATAA0.PTE), Dr. Szabó-Meleg Edina (MEEDAA.T.JPTE), Dr. Talián Csaba Gábor (TACRAAO.PTE), Dr. Visegrády Balázs (VIBAAB.T.JPTE), Huber Tamás (HUTEAB.T.JPTE), Hubertné Barkó Szilvia (BASFAA.T.JPTE), Kollár Veronika Tünde (KOVGACT.PTE), Leipoldné Vig Andrea (VIAFAAO.PTE), Szatmári Dávid (SZDHAAT.PTE), Tóth Mónika Ágnes (TOMIAAT.PTE), Türmer Katalin Erzsébet (TUKIAAT.PTE), Ujfalusi Zoltán (UJZDAAT.T.JPTE)
OAA-BMA  Public Health 1 (The Basics of Disease Prevention)

Course director: DR. ISTVÁN KISS, professor
Department of Public Health Medicine

1 credit • midsemester grade • Basic module • autumn semester • recommended semester: 1

Number of hours/semester: 7 lectures + 7 practices + 0 seminars = total of 14 hours
Course headcount limitations (min.-max.): 1 –
Prerequisites: no prerequisites

Topic
The subject analyses the factors influencing disease development, investigates the social and economic factors playing role in the health prevention. Represents the health care systems to introduce the students into this organisation, in where they should work later. Furthermore analyses some certain social group’s special health problems from the health prevention point of view.
After Public Health 6 the students must take a public health final exam which includes the material of all the Public Health subjects (Public Health 1 - 6).

Conditions for acceptance of the semester
Participation in practicals is obligatory which is registered.
Absences should not exceed 2x45 min. Otherwise signature of grade book is denied.

Mid-term exams
The mid-semester written exam is on the 11th week - passing it is the criterion of acceptance of the semester. In case of fail the exam can be rewritten on 14th week.

Making up for missed classes
Students may attend the practical of another group on the same week. Pre-consultation with practical leader is needed.

Reading material
- Obligatory literature
- Literature developed by the Department
  Educational material uploaded on CooSpace.
- Notes
- Recommended literature

Lectures
1 Global public health situation.
   Dr. Kiss István
2 The definition of health and disease. Health determinants.
   Dr. Kiss István
3 Public Health. The basics of disease prevention.
   Dr. Gombos Katalin
4 Mother and child health.
   Dr. Gombos Katalin
5 Health promotion. Health education.
   Dr. Patczainé Dr. Göcze Katalin Réka
6 The role of social factors on disease development.
   Dr. Berényi Károly
7 Health policy.
   Dr. Gombos Katalin

Practices
1 Mother and child health
2 Health problems of the youth
3 Health problems of the elderly
4 Rehabilitation, chronic nursing care, hospice
5 Special health situation of minorities
6 Special health situation of handicapped persons
7 Evidence based medicine
Seminars

Exam topics/questions

The mid-semester written exam relies on lectures and seminars and educational material uploaded on Coospace.

Participants

Dr. Berényi Károly (BEKFABO.PTE), Dr. Gombos Katalin (GOKFAAO.PTE), Dr. Patczainé Dr. Gőcze Katalin Réka (GOKFACO.PTE), Dr. Réka Zsuzsa (RAZVAAP.PTE)
OAA-MB1  MOLeCULAR Cell BIOLOGY 1

Course director:  DR. HAJNALKA GABRIELLA ÁBRAHÁM associate professor
Department of Medical Biology

6 credit • semester exam • Basic module • autumn semester • recommended semester: 1

Number of hours/semester: 42 lectures + 12 practices + 30 seminars = total of 84 hours
Course headcount limitations (min.-max.): 1 – 

Prerequisites: no prerequisites

Topic
To provide molecular and cellular biological basis for the teaching of anatomy, biochemistry, physiology, pathology, pathophysiology, microbiology and pharmacology. To teach students molecular cell biology facts essential for clinical subjects. The course covers cellular and molecular characteristics of the structure and functions of the cell. Main topics: functional morphology of eukaryotic cells; mechanisms of the storage, replication and expression of genetics information.
The detailed list of topics will be available on the first seminar for each group.

Conditions for acceptance of the semester
According to the Code of Studies and Examinations

Mid-term exams
Making up for missed classes
Extra lab programs at the end of each practical cycle.

Reading material
- Obligatory literature
- Literature developed by the Department
- Notes
- Recommended literature

Lectures
1 Educational objectives
  Dr. Szeberényi József
2 Comparison of prokaryotic and eukaryotic cells
  Dr. Szeberényi József
3 Modern morphological techniques I
  Dr. Komáromy László
4 Modern morphological techniques II
  Dr. Komáromy László
5 Methods of molecular biology I: Restriction endonucleases
  Dr. Szeberényi József
6 Methods of molecular biology II: DNA cloning. Genomic libraries
  Dr. Szeberényi József
7 Methods of molecular biology III: Polymerase chain reaction
  Dr. Szeberényi József
8 Methods of molecular biology IV: DNA sequencing
  Dr. Szeberényi József
9 Methods of molecular biology V: Transgenic organisms. Inhibition of gene function
  Dr. Szeberényi József
10 Methods of molecular biology VI: DNA chips
  Dr. Szeberényi József
11 The cell nucleus
  Dr. Komáromy László
12 Genome organisation
  Dr. Szeberényi József
13 The structure and chemical composition of chromatin
  ifj. Dr. Sétáló György
14 The phases of cell cycle. Cell division  
ifj. Dr. Sétáló György
15 The regulation of cell cycle  
ifj. Dr. Sétáló György
16 DNA replication in prokaryotes  
Dr. Szeberényi József
17 DNA replication in eukaryotes  
Dr. Szeberényi József
18 DNA repair  
Dr. Szeberényi József
19 Transcription in prokaryotes  
Dr. Szeberényi József
20 The synthesis and processing of pre-rRNA in eukaryotes  
Dr. Pap Marianna
21 The synthesis of pre-mRNA in eukaryotes  
Dr. Pap Marianna
22 pre-mRNA processing in eukaryotes  
Dr. Pap Marianna
23 The pathology of cell nucleus  
Dr. Komáromy László
24 Cytoplasmic organelles: An overview  
Dr. Komáromy László
25 Translation I: The components of protein synthesis  
Dr. Szeberényi József
26 Translation II: The mechanism of protein synthesis  
Dr. Szeberényi József
27 Translation III: The genetic code  
Dr. Szeberényi József
28 Regulation of gene expression in prokaryotes  
Dr. Szeberényi József
29 Regulation of gene expression in eukaryotes I: Levels of gene regulation  
Dr. Szeberényi József
30 Regulation of gene expression in eukaryotes II: Transcription factors  
Dr. Szeberényi József
31 Closing lecture  
Dr. Szeberényi József
32 Rough endoplasmic reticulum  
Dr. Komáromy László
33 Golgi complex. Protein glycosylation and sorting  
Dr. Komáromy László
34 Endocytosis. Vesicular transport  
Dr. Komáromy László
35 Cell defense mechanisms I: lysosomes, smooth endoplasmic reticulum  
Dr. Komáromy László
36 Cell defense mechanisms I: oxygen free radicals, membrane damage  
Dr. Komáromy László
37 Mitochondria I: Structure and function  
Dr. Szeberényi József
38 Mitochondria II: Genetic apparatus  
Dr. Szeberényi József
39 Cytoskeleton I: Microfilaments  
Dr. Komáromy László
40 Cytoskeleton II: Intermediate filaments and microtubules  
Dr. Komáromy László
41 The cell membrane  
Dr. Szeberényi József
42 Closing lecture  
Dr. Szeberényi József
Practices
1. Light microscopy. Isotopes
2. Light microscopy. Isotopes
3. Centrifugation, chromatography
4. Centrifugation, chromatography
5. Protein electrophoresis
6. Protein electrophoresis
7. Isolation of DNA
8. Isolation of DNA
9. Plasmid isolation
10. Plasmid isolation
11. Restriction endonuclease mapping
12. Restriction endonuclease mapping

Seminars
1. General information. Preview of lab cycle I
2. Biological macromolecules
3. Light microscopy
4. Comparison of pro- and eukaryotic cells
5. Separation methods
6. Methods of molecular biology I
7. Methods of molecular biology II.
8. TEST: Biological macromolecules. Light microscopy. Pro- and eukaryotic cells. Separation techniques
9. Methods of molecular biology III
10. Cell nucleus. Genome organisation
11. Chromatin
12. The cell cycle
13. Electron microscopy (demonstration)
14. DNA replication
16. DNA repair. Cell division. Preview of lab cycle II
17. Transcription
18. RNA processing
19. The pathology of cell nucleus
21. Translation
22. Gene regulation I
23. Gene regulation II
24. Rough ER. Golgi complex. Vesicular transport
25. Cell defense mechanisms
26. Mitochondria I
27. Mitochondria II
28. End- of semester discussion
29. SEMESTER TEST
30. SEMESTER TEST

Exam topics/questions
1. Proteins
2. Lipids
3. Carbohydrates
4. Nucleosides, nucleotides
5. The structure of DNA
6. Experiments proving that DNA is the genetic material
7. The structure and types of RNA
8. Comparison of pro- and eukaryotic cells
9. Methods of immunocytochemistry
10. Restriction endonucleases
11. Southern blotting
12. DNA sequencing
13. DNA chips
14. Genomic libraries
15. Polymerase chain reaction
16. Transgenic organisms
17. Targeted gene inactivation
18. Inhibition of gene expression at the level of mRNA
19. cDNA libraries
20. Northern blotting
21. Immunoprecipitation and Western blotting
22. The structure of cell nucleus
23. The organisation of chromatin
24. Unique and repetitive sequences
25. The chemical composition of chromatin
26. The phases of cell cycle
27. The regulation of cell cycle
28. Mitosis
29. Meiosis
30. General features of replication
31. The mechanism of replication in prokaryotes
32. Eukaryotic replication
33. DNA repair
34. The mechanism of prokaryotic transcription
35. General features of eukaryotic transcription
36. Synthesis and processing of eukaryotic pre-rRNA
38. Pre-mRNA splicing
39. Synthesis of aminoacyl-tRNA
40. The structure and function of ribosomes
41. The genetic code
42. Initiation of translation
43. Elongation and termination of translation
44. General features of translation
45. The lactose operon
46. The tryptophan operon
47. Cloning by nuclear transplantation
48. Regulation of pre-mRNA synthesis and processing in eukaryotes
49. Regulation of mRNA transport, translation and degradation in eukaryotes
50. Regulation of protein activity and degradation in eukaryotes
51. Eukaryotic transcription factors
52. The mechanism of action of steroid hormones
53. Rough endoplasmic reticulum
54. Golgi complex. Protein glycosylation
55. The mechanism of secretion
56. Endocytosis
57. The mechanism of vesicular transport
58. Lysosomes. Smooth endoplasmic reticulum
59. Oxygen free radicals. Membrane damage. Lipid peroxidation
60. The structure and function of mitochondria
61. The genetic apparatus of mitochondria
62. Mitochondrial diseases

Participants
Dr. Ábrahám Hajnalka Gabriella (ABHMAAO.PTE), Dr. Bátor Judit (BAJFAAO.PTE), Dr. Berta Gergely (BEGFADO.PTE), Dr. Fekete Zsuzsanna (FEZAAB.T.PTE), Dr. Galgóczi Szilvia (GASPABO.PTE), Dr. Pap Marianna (PAMFAAO.PTE), ifj. Dr. Sétáló György (SEGMAAO.PTE), Kiss Katalin (KIKFABO.PTE), Németh Mária (NEMGAAT.PTE), Varga Judit (VAJFACT.PTE)
**OAA-MET**

**Biometrics**

Course director: DR. LÁSZLÓ PÓTÓ, associate professor
Institute of Bioanalysis

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2 credit • semester exam • Basic module • autumn semester • recommended semester: 1

**Course description**

**Number of hours/semester:**
- 14 lectures + 14 practices + 0 seminars = total of 28 hours

**Course headcount limitations (min.-max.):**
- 1 -

**Prerequisites:** no prerequisites

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**Topic**

As a first course in statistics it covers the following main blocks: Basic data handling and computer use. Exploring data by graphical and numerical characterisation. Basic concepts of probability and statistical inference. The basic methods for statistical inference most frequently used in medicine.

As the main goal it focuses on the power of „statistical thinking” that is new to students and increasingly important at medical field.

**Conditions for acceptance of the semester**

Two written test, no more than two missed classes.

There is a three-steps exam for the grade: an entry-test, a problem to be solved by the computer (using SPSS) and a theory question. All the three should be completed at least ’satisfactory’ for a successful exam.

The list of the theory questions is attached below.

**Mid-term exams**

Two written test, no more than two missed classes.

**Making up for missed classes**

Extra class

**Reading material**

- **Obligatory literature**

- **Literature developed by the Department**

- **Notes**

- **Recommended literature**
  and:
  or

**Lectures**

1. Introduction (Statistics in medicine, models). Probability.
   Dr. Pótó László

2. Variables, Discrete distributions (binomial and Poisson).
   Dr. Pótó László

3. Continuous variables. Histogram, relative frequency density and probability density function.
   Dr. Pótó László

4. Mean and standard deviation. The normal distribution.
   Dr. Pótó László

5. Distribution of the sample mean, standard error.
   Dr. Pótó László

6. Confidence interval for the expected value. The t distribution
   Dr. Pótó László

7. Principle of hypothesis testing. The one sample and the paired samples t tests. The sign test (preview).
   Dr. Pótó László

8. The confidence interval and the hypothesis testing. Type I and type II errors.
   Dr. Pótó László

9. The independent samples t test. The F test.
   Dr. Pótó László
10 Linear regression and correlation.
   Dr. Pótó László

11 Contingency tables 1. The chi-squared test.
   Dr. Pótó László

12 The non-parametric tests (sign test, Wilcoxon and Mann-Whitney tests).
   Dr. Pótó László

13 The principle of the ANOVA. Summary of the hypothesis testing methods.
   Dr. Pótó László

14 Medical tests. Sensitivity and specificity. (Contingency tables 2.) Summary.
   Dr. Pótó László

Practices
1 Probability examples 1. + Using computers, Windows, SPSS.
2 Probability examples 2 - discrete distributions.
3 The binomial distribution.
5 Exploring data by numbers - descriptive statistics
6 Normal distribution. The distribution of the sample mean.
7 Estimations. The confidence interval of the expected value.
8 The hypothesis testing - the ’five steps’. The one sample (and the paired samples) t tests. The sign test.
9 Estimation and hypothesis testing. The Type one and Type two errors.
10 The independent samples t test.
11 The linear regression and correlation.
12 Contingency tables - the chi-squares test.
13 Nonparametric tests (Sign test, Wilcoxon tests, Mann-Whitney test)
14 Summary

Seminars

Exam topics/questions

1. The main goal of biometrics/biostatistics
   Compare the two models - what are the main differences?
   Relate them and show how they both have its role in the scientific work and in medicine.
   (Mainly from the lectures 1, 3, and 6-7-8)

2. The key feature of the statistical thinking - the probability
   Show this term - use a simple example, please. When can it be (and when can not be) calculated? Illustrate how both ways can be used in practical medical situations - by some examples.
   (Mainly from the lectures 1, 2, 6-7-8 and 12)

3. The idea of the probability distribution - discrete distributions - 1,
   Demonstrate on the example of the binomial distribution how the probability calculations (games of chances case) can be used in real life situations. How can you illustrate a distribution (graphically). Trace its role on the decision making.
   (Mainly from the lectures 2, 6-7-8 and 12)

4. The idea of the probability distribution - discrete distributions - 2,
   Contrast the binomial and the Poisson distributions: similarities and differences - demonstrated by some examples. Show the importance of discrete distributions trough examples. (Which hypothesis testing methods are based on this approximation?)
   (Mainly from the lectures 2, 6-7-8 and 12)

5. The basic principles of statistical thinking - from the data to the decision
   The way to the decision - and some pitfalls. (Size of the sample, representativity, lurking variables, probability decision, risk of errors, - and handling them)
   (Mainly from the lectures 3 and 6-7-8)

6. Types of the data (variables) and displaying them with graphs
   The three most frequent types of data and the methods for summarizing and displaying them.
   Applications of some diagrams - strength and weaknesses. What specific info can be observed from a given type of graph? When to choose a given type?
   (Mainly from the lecture 3 and 10)
7. The population and the sample
   Explain both terms in case of some different types of data. How to characterize (by pictures or numbers) the sample and the population in these examples? Discuss the basic role of both terms in the statistical inference and decision making
   (Mainly from the lectures 2, 3, 6-7-8 and 12)

8. Numerical description of continuous data
   Contrast the “five number” and “three number” descriptions. When to use one and when the other?
   Prove and demonstrate by examples the basic role of the two description while selecting the appropriate decision making (or hypothesis testing) method.
   (Mainly from the lectures 4, 6-7-8 and 12)

9. The idea of the probability distribution - continuous distributions
   Symmetrical and skewed distributions. How the measures of the sample show (mirror) the shape of the distribution? Demonstrate them on the example of the normal and some skewed distributions. Prove the importance of distinction between them (think to the condition of the decision making methods).
   (Mainly from the lectures 4, 6-7-8 and 12)

10. The normal distribution 1
    Features. Why is it so frequently used in biology and medicine?
    Application examples (reference range, ...).
    How does the “normal approximation” method demonstrate its importance (application examples) ... and how does the conditions of the hypothesis testing methods?
    (Mainly from the lectures 4, 5, 6-7-8 and 12)

11. The normal distribution 2
    How the “distribution of the mean” shows its importance? Verify the basic role of the “distribution of the mean” while statistical inference and decision making.
    (Mainly from the lectures 4, 5, 6-7-8-9-10)

12. Statistical inference
    The statistical inference is the main goal (final step) of the statistical thinking. Contrast the point- and the interval estimation from this point of view. Trace both methods (and the use of them) on the example of the confidence interval for the expected value (the \( p\% \) CI of the expected value).
    (Mainly from the lectures 5 and 6)

13. The confidence interval of the population mean
    You can find the “95\% CI” on most of the SPSS output (that you learned). What is that and why can you meet it so frequently at statistical analysis? Give examples of results screens (methods): why is it included in the given method - what is the use of it there?
    (Mainly from the lectures 5 and 6 - and all the lectures from then)

14. The basic idea of hypothesis testing
    Prove the relevance of the “five steps” method - and demonstrate it on everyday and medical examples. What are the simple given steps of the “five” and those that are require personal evaluation from case to case? Discuss these later ones on examples.
    (Mainly from the lectures 7 - and all the lectures from then)

15. The one sample and the paired t test
    At what kind of data (-structure) should you use this method? When hypothesis testing? Relate the two methods to each other. What can be done when the application conditions do not fit? Why not use these later methods at all the situations than?
    (Mainly from the lectures 6-7-8-9 and 12)

16. The confidence interval and the hypothesis testing
    Contrast the two methods: similarities and differences - strength and weaknesses.
    Demonstrate your evaluation on examples.
    (Mainly from the lectures 6-7-8)

17. The risk of errors and the power of a test
    Discuss the essential feature of the statistical decisions the risk of errors. How can you handle these risks? When should you handle these risks?
    Explain on examples: when can you use the value of the risk of a certain error and when to use the power of the test? (Which questions call for this kind of answers?)
    (Mainly from the lectures 8 and 9)
18. The two (independent) samples t test
   Contrast the paired and independent samples t tests? What are the typical questions which call for the later method? What is the specific requirement (condition) of this method - and how can you handle this with the help of the F test?
   (What should we “pay for” that solution? Why not to use always the solution which has less requirements?)
   (Mainly from the lecture 9)

19. Connection between two variables - continuous variables
   Contrast the “one variable - two samples” and the “two variables” - paired data (“one sample”)? Cases. What are the typical questions in the two cases?
   Use examples to explain the method of the linear regression and correlation analysis. Stress the steps where there is an obvious role of statistical thinking.
   Is this method a hypothesis test?
   (Mainly from the lecture 10)

20. Connection between two variables - categorical variables
   Relate to each other the “two variables” methods for continuous and categorical variables - similarities and differences. Which numbers are to be evaluated in the later case?
   Which hypothesis testing method(s) are available for that? Explain the five steps on an example. What are the conditions for applying the method(s) and what to do when those conditions are not valid?
   (Mainly from the lectures 11 and 12)

   Why the chi-squares test is not applicable in the medical practice frequently? What to do then? When to use the Fisher’s exact test - out of those cases? What the “exact?” word means in the name?
   (Mainly from the lectures 11 and 12)

   How to qualify a diagnostic test? Which questions can be answered by the “sensitivity”, “specificity” and the “predictive value(s)” of the test?
   The confidence interval for the proportion. Explain (using the previous term) why the chi-squares test gives “not significant” result at evaluations of medical data frequently.
   (Mainly from the lectures 11 and 12)

23. Nonparametric tests - 1.
   When to refuse the application of a t test - and when to apply the sign test instead? Demonstrate the “five steps” on an example using the sign test. Contrast this method and the appropriate “parametric” one? What are the strength and weaknesses of this method?
   (Mainly from the lectures 2, 7 and 12)

   When to refuse the application of a t test - and when to apply the Wicoxon and the Mann-Whitney test instead? Demonstrate the application of both tests on examples. Contrast these methods and the appropriate “parametric” ones? What are the strength and weaknesses of these methods?
   (Mainly from the lectures 2, 9 and 12)

25. The principle of the ANOVA
   Demonstrate the application of the ANOVA method on an example
   What is the basic idea of the evaluation? Illustrate it on the case of comparing several group means simultaneously.
   What is the strength of this method in contrast to the several t tests for pairs of groups?
   (Mainly from the lectures 2, 8, 9 and 13)

Participants
Dr. Dergez Timea (DETCAAT.T.JPTE), Dr. Kilárr Ferenc (KIFGAAO.PTE), Dr. Pótó László (POLGABO.PTE), Kőnigné Péter Anikó (PEAAAB.T.JPTE)
OAA-OET  Behavioral Science 2 (Medical Ethics)

Course director: DR. ZSUZSANNA FÜZESI, professor
Department of Behavioural Sciences

<table>
<thead>
<tr>
<th>1 credit • midterm grade • Basic module • autumn semester • recommended semester: 1</th>
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<tbody>
<tr>
<td>Number of hours/semester: 0 lectures + 0 practices + 14 seminars = total of 14 hours</td>
</tr>
<tr>
<td>Course headcount limitations (min.-max.): 5 – 250</td>
</tr>
<tr>
<td>Prerequisites: no prerequisites</td>
</tr>
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</table>

1. The differences between traditional medical ethics and modern bioethics
2. Rationality and ethics
3. The main moral theories
4. The principle of informed consent
5. Problems in the care of the terminally ill
6. Problems in the care of the terminally ill
7. The moral status of abortion
8. The ethics of organ and tissue transplantation
9. Ethical issues raised by reproductive medicine
10. Ethical issues raised by reproductive medicine
11. The placebo effect
12. Neuroethics
13. Summarizing discussion
14. Written test

Exam topics/questions

Additional materials: CooSpace

Participants
Dr. Szolcsányi Tibor (SZTAAJ.B.JPTE)
OAA-OKG  MEDICAL COMMUNICATION SKILLS
Course director: DR. SÁNDOR BALOGH, associate professor
Family Medicine Institute

1 credit • midsemester grade • Basic module • autumn semester • recommended semester: 1
Number of hours/semester: 6 lectures + 8 practices + 0 seminars = total of 14 hours
Course headcount limitations (min.-max.): 5 – 200  Prerequisites: no prerequisites

Topic

Conditions for acceptance of the semester
Visiting the seminars is compulsory. Every student should join the group which is assigned on the ETR.
Before the end of the semester a grade will be offered which is made up from the test results of the lectures and the seminars.

Mid-term exams
None

Making up for missed classes
None

Reading material
- Obligatory literature
  János Pilling: Medical Communication, Medicina Publishing House, 2011
- Literature developed by the Department
- Notes
- Recommended literature

Lectures
1  Shall I become a doctor? Introduction to the Doctor Patient Encounter (Balogh Sándor, Bán Ildikó)
   Dr. Bán Ildikó
2  Verbal Communication - Our Words
   Dr. Balogh Sándor
3  Non-verbal Communication
   Dr. Bán Ildikó
4  Difficult Patients
   Dr. Bán Ildikó
5  Doctor-Patient Encounter, Summary
   Dr. Bán Ildikó
6  Doctor-Patient Encounter, Summary
   Dr. Bán Ildikó

Practices
1  Introduction-Getting to know each other
2  Interviewing patient, Verbal Communication
3  Non verbal communication
4  Difficult patients-difficult situations
5  Breaking Bad news
6  Situations, role plays
7  Difficult patients-difficult situations
8  Non verbal communication

Seminars
Exam topics/questions

Participants
Dr. Bán Ildikó (BAIFACO.PTE), Dr. Heim Szilvia (HESPAAP.PTE), Dr. Rinfel József (REJPAAP.PTE), Dr. Somogyi Lászlóné (SOLTAE0.PTE), Várbiróné Dr. Csikós Ágnes (VACTAB0.PTE)
**OAA-ORK  MEDICAL CHEMISTRY**

**Course director:**
DR. RÓBERT OHMACHT, professor
Department of Biochemistry and Medical Chemistry

<table>
<thead>
<tr>
<th>Credit</th>
<th>Semester exam</th>
<th>Basic module</th>
<th>Autumn semester</th>
<th>Recommended semester: 1</th>
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**Number of hours/semester:**
42 lectures + 28 practices + 14 seminars = total of 84 hours

**Course headcount limitations (min.-max.):**
1 – 300

**Prerequisites:** no prerequisites

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**Topic**

Medical chemistry includes the topics of general chemistry which are necessary for medical students. It deals also with the chemistry of organic functional groups in concise way. Majority of the curriculum deals with the bioorganic chemistry, which means the chemistry and descriptive biochemistry of biomolecules. The purpose of practices is to study some analytical chemistry and the knowledge of materials. Curriculum of medical chemistry contains the basic knowledge that is necessary to understand biochemistry, pharmacology and clinical chemistry.

**Conditions for acceptance of the semester**

Requirement for acceptance of Medical Chemistry (i.e. signature) is: The student has to attend minimum 85% of the classes (she/he can miss maximum 13 hours out of 84.), completing two Test Papers reaching minimum 30% as an average. During weeks 3-12 of the semester there are short tests at the beginning of each practice. Additional requirement for acceptance of Medical Chemistry is writing 8 out of these 10 tests, and minimum 5 out of them should be correct and accepted by the lab instructor. It is obligatory to write lab-notes. Result of the short test is acknowledged only if the lab-note of the practice is accepted by the lab instructor. If somebody is late less than 10 minutes, though his/her test is worth zero point, but he/she may perform the lab experiments and this occasion will not be considered as an absence. Further additional requirement for acceptance of Medical Chemistry is successfully completing the General Chemistry course.

**Mid-term exams**

Making up for missed classes

None.

**Reading material**

- **Obligatory literature**
  - Textbooks:
    - McMurray, Fay: Chemistry, latest edition
    - P. Gergely (ed.): Organic and Bioorganic Chemistry for Medical Students, latest edition, Univ. Med. School of Debrecen
  - Literature developed by the Department
  - Notes

- **Recommended literature**
  - Recommended literature:
    - Veronika Nagy (ed.): Laboratory Experiments in Medical Chemistry, Internet edition, Univ. Med. School of Pécs, 2011
    - K. C. Timberlake: Chemistry - An Introduction to General, Organic, and Biological Chemistry, latest edition

**Lectures**

1. Introduction to Medical Chemistry, its relationship with medicine.
   Dr. Ohmacht Róbert
2. The periodic table, the electronic structure of atoms.
   Dr. Nagy Veronika
3. Chemical bonds. Ionic, covalent and metallic bond
   Dr. Nagy Veronika
   Dr. Nagy Veronika
5. Secondary interactions.
   Dr. Nagy Veronika
6. Chemistry, types and properties of the elements.
   Dr. Berente Zoltán
7. Oxides, hydroxides, acids, bases and salts.
   Dr. Berente Zoltán
8. States of matter, gas laws.
   Dr. Takátsy Anikó
9 Water and aqueous solutions. Colligative properties of dilute solutions. Composition of biofluids
   Dr. Takátsy Anikó
10 Role of electrolytes in living organisms
   Dr. Berente Zoltán
11 Chemical equilibrium, mass action law
   Dr. Lóránd Tamás
12 Heterogeneous equilibria. Solubility product constant. Gallstones and kidney stones
   Dr. Lóránd Tamás
13 Acids and bases
   Dr. Lóránd Tamás
14 Ion product constant of water, pH, pOH
   Dr. Lóránd Tamás
15 Hydrolysis of salts. Buffer solutions.
   Dr. Lóránd Tamás
16 Buffer systems in living organisms
   Dr. Takátsy Anikó
17 Structure and formation of complexes.
   Dr. Takátsy Anikó
18 Metal complexes in living organisms and in medical diagnosis
   Dr. Takátsy Anikó
19 Colloid systems
   Dr. Berente Zoltán
20 Colloid systems in living organisms
   Dr. Dóczi Tamás
21 Chemical kinetics
   Dr. Nagy Veronika
22 Thermodynamics: Energy changes in chemical reactions
   Dr. Nagy Veronika
23 Thermodynamics: spontaneous and non-spontaneous reactions
   Dr. Nagy Veronika
24 Photochemistry. Light induced reactions in living organisms
   Dr. Nagy Veronika
25 Electrochemistry
   Dr. Berente Zoltán
26 Electron transfer processes in living organisms
   Dr. Berente Zoltán
27 Introduction to organic chemistry
   Dr. Agócs Attila
28 Reaction types in organic chemistry
   Dr. Agócs Attila
29 Saturated hydrocarbons: Alkanes. Paraffins in medicine
   Dr. Lóránd Tamás
30 Unsaturated hydrocarbons: Alkenes and alkynes
   Dr. Lóránd Tamás
31 Isomerism among alkanes, cycloalkanes and alkenes
   Dr. Lóránd Tamás
32 Aromatic hydrocarbons. Organic halides
   Gulyás Gergely
33 Optical isomerism. Relative and absolute configuration.
   Dr. Agócs Attila
34 Alcohols
   Dr. Lóránd Tamás
35 Phenols
   Dr. Lóránd Tamás
36 Ethers
   Dr. Lóránd Tamás
37 Organic thio compounds
   Dr. Lóránd Tamás
38 Aldehydes and their derivatives  
Dr. Agócs Attila  
39 Ketones, quinones  
Dr. Agócs Attila  
40 Amines and their biologically relevant derivatives  
Dr. Lóránd Tamás  
41 Carboxylic acids  
Dr. Lóránd Tamás  
42 Carboxylic esters, phosphate esters and sulphate esters  
Dr. Lóránd Tamás

Practices
1 Laboratory regulations. Accident and fire protection
2 Laboratory regulations. Accident and fire protection
3 Introductory discussion
4 Introductory discussion
5 Experiments with compounds of halogens, oxygen-group and nitrogen group elements
6 Experiments with compounds of halogens, oxygen-group and nitrogen group elements
7 Experiments with compounds of carbon-group, aluminium and s-block elements
8 Experiments with compounds of carbon-group, aluminium and s-block elements
9 Discussion
10 Discussion
11 Titration of Betacid solution
12 Titration of Betacid solution
13 Potentiometry. Buffer solutions.
14 Potentiometry. Buffer solutions.
15 Reactions of coordinative (complex) compounds.
16 Reactions of coordinative (complex) compounds.
17 Experiments on colloidal systems, chemical equilibria, and catalysis
18 Experiments on colloidal systems, chemical equilibria, and catalysis
19 Experiments in Electrochemistry
20 Experiments in Electrochemistry
21 Organic chemistry I. Reactions of functional groups I
22 Organic chemistry I. Reactions of functional groups I
23 Organic chemistry II. Reactions of functional groups II
24 Organic chemistry II. Reactions of functional groups II
25 Organic chemistry III. Reactions of functional groups III
26 Organic chemistry III. Reactions of functional groups III
27 Closing remarks, repetition
28 Closing remarks, repetition

Seminars
1 Basic concepts, stoichiometric calculations
2 Stoichiometric calculations
3 Geometry and polarity of molecules. Intermolecular interactions
4 Concentration of solutions
5 Structure of simple organic molecules
6 Naming organic molecules. Isomerism
7 Structure and properties of various types of organic compounds
8 Stereochemistry I. Chirality, enantiomers
9 Stereochemistry II: Diastereomers
10 Reactions in organic chemistry I: Types of reactions
11 Reactions in organic chemistry II: Alkenes and aromatic compounds
12 Reactions in organic chemistry III: Alcohols
13 Reactions in organic chemistry IV: Oxo compounds
14 Reactions in organic chemistry V: Carboxylic acids
Exam topics/questions

Participants
Bóna Ágnes (BOARAO.PTE), Böddi Katalin (BOKDAA.T.JPTE), Dr. Berente Zoltán (BEZLAAP.PTE), Dr. Jakus Péter (JAPAAA.T.JPTE), Dr. Lóránd Tamás (LOTGAAO.PTE), Dr. Márk László (MALMAAO.PTE), Dr. Nagy Veronika (NAVOAAK.PTE), Dr. Petrovics Dóra (PEDIAAT.PTE), Dr. Takátsy Anikó (TAAAAA.T.JPTE), Radó-Turcsi Erika Margit (RAESAAP.PTE)
**OAR-ELS FIRST AID**

**Course director:**

| DR. LAJOS BOGÁR, professor |
| Department of Emergency Medicine |

0 credit • signature • Criterion requirement module • autumn semester • recommended semester: 1

**Number of hours/semester:** 0 lectures + 14 practices + 0 seminars = total of 14 hours

**Course headcount limitations (min.-max.):** 1 – 250

**Prerequisites:** no prerequisites

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**Topic**

Short description of the curriculum:

The first year students are expected to learn the basic elements of the emergency treatment and the methods of life saving interventions during the 14 class practice. The teaching will provide enough skill training for recognizing the signs of cardiac and breathing arrests and for performing the steps of basic life support interventions. Furthermore, the students are also expected to learn how to avoid life threatening secondary complications in accident victims on the scene and during transportation as well as in the emergency room. They will have to properly diagnose and help patients with acute chest pain, severe poisoning, metabolic disorders and acute central nervous diseases. The students are also expected to properly deal with acute airway obstructions using different first aid maneuvers.

**Goals of the course in relation to the medical curriculum:**

The discipline has two major goals. First: the students will have to be able to provide first aid to patients in acute illness in out-of-hospital settings. Second: the student being at the beginning of their medical curriculum should receive practical information reflecting the importance of the preclinical disciplines. In this way the students’ interest will hopefully rise towards the theoretical subjects and they can understand the scientific connections between basic and applied medical sciences.

**Conditions for acceptance of the semester**

The maximal absences are 20% of the practice time.

**Mid-term exams**

Making up for missed classes

The student can join other group for the supplementation.

**Reading material**

- **Obligatory literature**
- **Literature developed by the Department**
- **Notes**
- **Recommended literature**
  
  
  

**Lectures**

**Practices**

1. Principles of basic life support (first aid in life threatening emergencies, ABC of resuscitation, indications, methods of external cardiac compression, skill).
3. First workout of the elements of basic life support.
4. First workout of the elements of basic life support.
5. Acute chest pain syndromes (acute myocardial infarction, etc.)
6. Acute chest pain syndromes (acute myocardial infarction, etc.)
9. Severe poisoning.
10. Severe poisoning.
11. Dangerous metabolic abnormalities, airway obstructions, acute central nervous
12. Dangerous metabolic abnormalities, airway obstructions, acute central nervous
13. Second workout of the elements of basic life support.
14. Second workout of the elements of basic life support.
Seminars

Exam topics/questions

Participants

Dr. Bátaí István (BAIMABO.PTE), Dr. Csontos Csaba (CSCSAAP.PTE), Dr. Heigl Péter (HEPFAAO.PTE), Dr. Jáksó Krisztián (JAKFAAO.PTE), Dr. Kiss Tamás (KITFAAO.PTE), Dr. Molnár Tíhamér (MOTTAO.PTE), Dr. Nagy Bálint János (NABGAAO.PTE), Dr. Szabó Zoltán (SZZUABO.PTE), Dr. Weiling Zsolt (WEZMAAO.PTE)
Topic

The course provides the basics of chemistry for students in the medical school to widen their knowledge acquired in other first semester courses. Calculations will be also a major topic in the seminars.

Conditions for acceptance of the semester

A startout survey test can be written during the first week. Students achieving more than 50% will be exempted from attending the course.

Mid-term exams

For all the other students two tests will be written during the semester (probably on the 6th and 12th weeks). The students have to obtain at least 30% of the points of two tests to fulfil the requirements.

Making up for missed classes

Not possible.

Reading material

- Obligatory literature
  - McMurry, Fay: Chemistry
  - P. Gergely: Organic and Bioorganic Chemistry for Medical Students

- Literature developed by the Department

- Notes

- Recommended literature

Lectures

Practices

Seminars

1 Atomic Theory and Periodic Table
2 Importance of inert gas electron configuration, the chemical bond
3 The mol, molar mass of compounds calculation of molar mass
4 The chemical reaction, type of chemical reactions
5 Writing and balancing chemical equations,
6 Understanding and balancing oxidation-reduction equations
7 Writing and balancing oxidation-reduction equations
8 Concentration calculations 1
9 Concentration calculations 2
10 Concentration calculations 3
11 Concentration calculations 4
12 Gas laws, partial pressures
13 Calculations with gas laws
14 Calculations with gas laws
15 Chemical equilibrium, effect of concentration on equilibrium
16 pH calculations 1
17 Dissociation, ionization constants
18 pH calculations 2
19 Basics of Thermochemistry
20 pH calculations 3
21 Definition and classification of organic compounds
22 Buffer pH calculations
23 Molecular structure and physical properties of organic compounds
24 Reactions in organic chemistry 1
25 Reactions in organic chemistry 2
26 Reactions in organic chemistry 3
27 Repetition, summing up
28 Repetition, summing up

Exam topics/questions

Participants
Bóna Ágnes (BOARAO,PTE), Bölodi Katalin (BOKDAAT.PTE), Dr. Berente Zoltán (BEZLAAP,PTE), Dr. Jakus Péter (JAPAAA.TJPTE), Dr. Lóránd Tamás (LOTGAO,PTE), Dr. Márk László (MALMAO,PTE), Dr. Nagy Veronika (NAVOAAK,PTE), Dr. Petrovics Dóra (PEDIAAT,PTE), Dr. Takátsy Anikó (TAAAAAJPTE), Radó-Turcsí Erika Margit (RAESAAP,PTE)
OAA-AA1  Anatomy 1

Course director: DR. BALÁZS GASZNER, associate professor
Department of Anatomy

5 credit • semester exam • Basic module • spring semester • recommended semester: 2

Number of hours/semester: 14 lectures + 56 practices + 0 seminars = total of 70 hours
Course headcount limitations (min.-max.): 5 – 200
Prerequisites: OAA-SF1 parallel

Topic
Anatomy-1 is to teach you the macroscopic structure of bones, joints, and muscles of the human body, as well as the regional anatomy of the trunk and limbs including their functional and developmental aspects. This is the first part of a two-semester subject.

Conditions for acceptance of the semester
Presence on at least 85% of course hours is required. Absence (for any reason) is max. 11 teaching hours (= 11x45 min.) including max. 9 practice hours.

Mid-term exams
Making up for missed classes
Exceptionally, students may attend the practice of another group (on the same week). Students are allowed to make up two classes in one semester this way. The teacher of the other group gives the permission to attend the class to the request of the student, however the query may be refused if the group is full.

Reading material
- Obligatory literature
- Literature developed by the Department
  http://an-server.pote.hu
- Notes
- Recommended literature
  http://an-server.pote.hu

Lectures
1  Introduction to the Anatomy.
   Dr. Reglodi Dóra
2  General osteology and arthrology.
   Dr. Gaszner Balázs
3  The pelvis and the foot. Structures and functions.
   Dr. Tóth Pál
4  Clinical aspects of pelvic diameters. The anatomical background of knee injuries.
   Dr. Tamás Andrea
5  General myology, angiology and neurology. Introduction to the regional anatomy.
   Dr. Hollósy Tibor
6  Structure and movements of the thorax and vertebral column.
   Dr. Csernus Valér
7  Lymphatic drainage of the limbs and breast. Clinical importance of the primary lymph nodes.
   Dr. Schmidt Erzsébet
8  Bones and structure of the skull. The neurocranium.
   Dr. Kiss Péter
9  Bones and cavities of the viscerocranium.
   Dr. Pethőné Dr. Lubics Andrea
10 Clinical aspects of the muscles of the lower extremity.
   Dr. Than Péter
11 Review of the upper limb I.; Joints, muscles and their functions.
   Dr. Reglodi Dóra
12 Review of the upper limb II; Blood and nerve supply. Frequent injuries and their consequences.
   Dr. Reglodi Dóra
13 Review of the lower limb I.; Joints, muscles and their functions.
   Dr. Pethőné Dr. Lubics Andrea
14 Review of the lower limb II; Blood and nerve supply. Frequent injuries and their consequences.
   Dr. Pethőné Dr. Lubics Andrea
Practices

1. Terms of position and direction. The main plains.
2. Bones of the shoulder girdle.
4. Bones of the arm and forearm 2.
5. Bones of the hand.
7. The shoulder joint.
8. The elbow joint.
11. The hip bone and sacrum. The skeleton of pelvis.
12. The lesser pelvis.
13. The femur.
15. The hip joint.
16. The knee joint.
17. The skeleton and joints of the foot 1.
18. The skeleton and joints of the foot 2.
21. Topographic anatomy of the ventral aspect of upper and lower limbs 1.
22. Topographic anatomy of the ventral aspect of upper and lower limbs 2.
23. Topographic anatomy of the ventral aspect of upper and lower limbs 3.
25. Topographic anatomy of the ventral aspect of limbs. The structure and regions of the abdominal wall 1.
26. Topographic anatomy of the ventral aspect of limbs. The structure and regions of the abdominal wall 2.
27. Topographic anatomy of the ventral aspect of limbs. The structure and regions of the abdominal wall 3.
29. Topographic anatomy of the ventral aspect of limbs and abdominal wall 5. The vertebrae, ribs, and thorax 1.
32. Topographic anatomy of the ventral aspect of limbs and abdominal wall 8. The vertebrae, ribs, and thorax 4.
34. Topographic anatomy of the ventral aspect of limbs and abdominal wall 10. Joints of the vertebral column and thorax 2.
41. Topographic anatomy of the dorsal aspect of limbs and abdominal wall 1. The skull 5.
42. Topographic anatomy of the dorsal aspect of limbs and abdominal wall 2. The skull 6.
43. Topographic anatomy of the dorsal aspect of upper and lower limbs 3. The skull 7.
44. Topographic anatomy of the dorsal aspect of upper and lower limbs 4. The skull 8.
54. Dorsal and ventral regions of the limbs. Recapitulation 2.
55. Dorsal and ventral regions of the limbs. Recapitulation 3.
Seminars

Exam topics/questions

http://an-server.pote.hu

Participants

Bodrogi Ákos (BOAQAO.PTE), Czett András (CZASAAO.PTE), Dr. Csernus Valér (CSVGAAO.PTE), Dr. Czeiter Endre (CZEFAAO.PTE), Dr. Dányádi Bese (DABNAAO.PTE), Dr. Farkas Boglárka (FABFADO.PTE), Dr. Farkas József (FAJHAAO.PTE), Dr. Fülöp Balázs Dániel (FUBOAA-O.PTE), Dr. Gaszner Balázs (GABFADO.PTE), Dr. Hollósy Tibor (HOTFAAO.PTE), Dr. Horváth Gábor (HOGNAAO.PTE), Dr. Horváth Judit (HOJIAAO.PTE), Dr. Horváth-Oppe Gabriella (HOGFAFO.PTE), Dr. Kardos Dániel József (KADPABO.PTE), Dr. Kiss Péter (KIPFABO.PTE), Dr. Kvarik Timea (KVTOAA-O.PTE), Dr. László Eszter (LAEOAO-O.PTE), Dr. Mammel Barbara (MABMAAB.PTE), Dr. Nagy András Dávid (NAAFAFO.PTE), Dr. Pethőné Dr. Lubics Andrea (PELMAAO.PTE), Dr. Rékási Zoltán (REZMAAO.PTE), Dr. Tamás Andrea (TAAFABO.PTE), Dr. Tima Lajos (TILGAAO.PTE), Dr. Tóth Pál (TOPMAAO.PTE), Dr. Werling Dóra (WEDNAAT.PTE), Fábián Eszter (FAEGAAT.PTE), Gaszner Tamás (GATRAAO.PTE), Kovács László Ákos (KOLQAAO.PTE), Oppe Balázs (OPBFAB.T.PTE)
## OAA-AED Public Health 2 (General Epidemiology and Demography)

<table>
<thead>
<tr>
<th>Course director:</th>
<th>DR. ISTVÁN KISS, professor</th>
</tr>
</thead>
<tbody>
<tr>
<td>Department of Public Health Medicine</td>
<td></td>
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</tbody>
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<table>
<thead>
<tr>
<th>2 credit • semester exam • Basic module • spring semester • recommended semester: 2</th>
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<tr>
<td>Number of hours/semester: 14 lectures + 14 practices + 0 seminars = total of 28 hours</td>
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<tr>
<td>Course headcount limitations (min.-max.): 1 –</td>
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<tr>
<td>Prerequisites: OAA-MET completed + OAA-BMA completed</td>
</tr>
</tbody>
</table>

### Topic

The subject describes the methodological basis of population level studies on the causative agents and risk factors of diseases. It analyses the criteria of the causality, and the aspects of design, performing and critical analysis of epidemiological studies. It studies the structure of a population, its temporal changes, and the interaction between demographical variables and health. After Public Health 6 the students must take a public health final exam which includes the material of all the Public Health subjects (Public Health 1 - 6).

### Conditions for acceptance of the semester

Participation in practicals is obligatory which is registered.

Absences should not exceed 2x45 min. Otherwise signature of grade book is denied.

### Mid-term exams

Exam: written test + mid-semester exam on 8th week (computer program used in epidemiological statistics). Passing it is the criterion of acceptance of the semester. In case of fail SPSS exam can be rewritten on 9th week.

### Making up for missed classes

Students may attend the practical of another group on the same week. Pre-consultation with practical leader is needed.

### Reading material

- **Obligatory literature**
  - Bonita-Beaglehole-Kjellström: Basic Epidemiology, 2nd edition, WHO 2006 (selected chapters only): Chapter 2, Chapter 3, Logistic regression and Kaplan-Meier survival curves in Chapter 4, Chapter 5, Screening in Chapter 6 - (you can find a copy of the textbook on CooSpace downloaded from the official WHO website)
  - In the exam the knowledge of every delivered lecture and practice can be asked (also those facts, which are not written on the slides but were mentioned at the lessons!!)

- **Literature developed by the Department**
  - Educational material uploaded on CooSpace.

- **Notes**

- **Recommended literature**

### Lectures

1. Definition, history, goal and concept of epidemiology.  
   Dr. Kiss István
   Dr. Kiss István
3. Epidemiological studies: Descriptive epidemiology.  
   Dr. Kiss István
4. Analytical epidemiological studies. I.  
   Dr. Kiss István
5. Analytical epidemiological studies. II.  
   Dr. Kiss István
   Dr. Kiss István
7. Bias, confounding.  
   Dr. Kiss István
8. Systematic review, meta-analysis.  
   Dr. Kiss István
   Dr. Gombos Katalin
Dr. Patczainé Dr. Göczé Katalin Réka  

Dr. Gombos Katalin  

12 Changes in population structure and their determinants.  
Dr. Gombos Katalin  

13 Demographic transition.  
Dr. Gombos Katalin  

14 Demographical characteristics of developed and developing countries.  
Dr. Kiss István  

Practices  
1 Problem solving in the epidemiology I.  
2 Problem solving in the epidemiology II.  
3 Epidemiological indicators and their application I.  
4 Epidemiological indicators and their application II.  
5 Epidemiological calculations: odds ratio, relative risk I.  
6 Epidemiological calculations: odds ratio, relative risk II.  
7 Epidemiological calculations: confounders, stratified analysis I. (SPSS I.)  
8 Epidemiological calculations: confounders, stratified analysis II. (SPSS I.)  
9 Epidemiological calculations: sample size, survival curves, logistic regression I. (SPSS II.)  
10 Epidemiological calculations: sample size, survival curves, logistic regression II. (SPSS II.)  
11 Analysis of an epidemiological study I. (SPSS III.)  
12 Analysis of an epidemiological study II. (SPSS III.)  
13 Standardization I.  
14 Standardization II.  

Seminars  

Exam topics/questions  
- Rely on material from lectures and seminars  
- Educational material uploaded on Coospace  

Participants  
Bérczi Bálint Dániel (BEBIABT.PTE), Dr. Berényi Károly (BEKFABO.PTE), Dr. Gombos Katalin (GOKFAAO.PTE), Dr. Patczainé Dr. Göczé Katalin Réka (GOKFACO.PTE), Dr. Szabó István (SZIGABO.PTE)
OAA-BEB  INTRODUCTION TO BIOCHEMISTRY

Course director: DR. RÓBERT OHMACHT, professor
Department of Biochemistry and Medical Chemistry

4 credit • semester exam • Basic module • spring semester • recommended semester: 2

Number of hours/semester: 28 lectures + 28 practices + 0 seminars = total of 56 hours
Course headcount limitations (min.-max.): 1 – 10
Prerequisites: no prerequisites

Topic

“Introduction to Biochemistry” includes the topics of organic and bioorganic chemistry along with basic biochemistry which are necessary for medical students. It deals with the structure, chemistry, and cellular degradation of essential biomolecules like proteins, carbohydrates and lipids. The purpose of practices is to study some analytical chemistry and the knowledge of materials. Curriculum of medical chemistry contains the basic knowledge that is necessary to understand biochemistry, pharmacology and clinical chemistry.

Conditions for acceptance of the semester

Requirement for acceptance of „Introduction to biochemistry” (i.e. signature) is completing two Test Papers reaching minimum 30% as an average. During weeks 2-12 of the semester there are short tests at the beginning of each practice. Additional requirement for acceptance of „Introduction to biochemistry” is writing 8 out of these 10 tests, and at least 5 out of them should be correct and accepted by the lab instructor. It is obligatory to write lab-notes. Result of the short test is acknowledged only if the lab-note of the practice is accepted by the lab instructor.

Mid-term exams

Making up for missed classes

None.

Reading material

- Obligatory literature
  McMurray, Fay: Chemistry, latest edition
  Darrell D. Ebbing (ed.): General Chemistry, latest edition
  P. Gergely (ed.): Organic and Bioorganic Chemistry for Medical Students, Univ. Med. School of Debrecen
  K. C. Timberlake: Chemistry - An Introduction to General, Organic and Biological Chemistry, latest edition

- Literature developed by the Department

- Notes
  Veronika Nagy (ed.): Laboratory Experiments in Medical Chemistry, Internet edition, Univ. Med. School of Pécs, 2011

- Recommended literature

Lectures

1  Other derivatives of carboxylic acids
   Dr. Lóránd Tamás
2  Heterocyclic compounds, carbonic acid derivatives
   Dr. Lóránd Tamás
3  Biologically relevant heterocyclic compounds
   Dr. Lóránd Tamás
4  Alkaloids, pharmacologically active compounds
   Dr. Lóránd Tamás
5  Nucleosides, nucleotides, nucleic acids
   Dr. Nagy Veronika
6  Nucleotide coenzymes, bioenergetics
   Dr. Berente Zoltán
7  Amino acids, peptides
   Dr. Berente Zoltán
8  Proteins, primary structure, sequencing
   Dr. Berente Zoltán
9  Protein 3D structure and function
   Dr. Berente Zoltán
10 Hemoglobin, oxygen transport
    Dr. Takátsy Anikó
11 Basics of enzyme kinetics  
Dr. Berente Zoltán  
12 Regulation and inhibition of enzymatic activity, isoenzymes  
Dr. Berente Zoltán  
13 Structure and reactivity of carbohydrates  
Dr. Nagy Veronika  
14 Medically relevant mono-, di- and oligosaccharides  
Dr. Nagy Veronika  
15 Reactions of glycolysis  
Dr. Nagy Veronika  
16 Regulation of glycolysis  
Dr. Jakus Péter  
17 Metabolic pathways linked to glycolysis  
Dr. Jakus Péter  
18 Composition of simple and complex lipids  
Dr. Nagy Veronika  
19 Biologically relevant lipids (prostaglandins, terpenoids)  
Dr. Nagy Veronika  
20 Biologically relevant lipids (steroids)  
Dr. Lóránd Tamás  
21 Characterization of biological membranes  
Dr. Takátsy Anikó  
22 Fatty acid oxidation  
Dr. Nagy Veronika  
23 Reactions of TCA cycle (PDC included)  
Dr. Nagy Veronika  
24 Regulation of TCA cycle  
Dr. Nagy Veronika  
25 Respiratory chain and its inhibition  
Dr. Takátsy Anikó  
26 ATP synthesis  
Dr. Takátsy Anikó  
27 Mitochondrial transport processes, shuttles  
Dr. Takátsy Anikó  
28 Supramolecular organization of functionally related enzymes  
Dr. Berente Zoltán  

Practices  
1 Purification of a drug mimetic compound  
2 Purification of a drug mimetic compound  
3 Liophilisation, solid-liquid extraction.  
4 Liophilisation, solid-liquid extraction  
5 Isolation of caffeine  
6 Isolation of caffeine  
7 Quantitative analysis of nucleic acids  
8 Quantitative analysis of nucleic acids  
9 Column chromatography, ion exchange chromatography, TLC  
10 Column chromatography, ion exchange chromatography, TLC  
11 HPLC, MS  
12 HPLC, MS  
13 Proteins, gel filtration, dialysis  
14 Proteins, gel filtration, dialysis  
15 Properties of carbohydrates  
16 Properties of carbohydrates  
17 Enzymatic catalysis  
18 Enzymatic catalysis  
19 Warburg’s optical test  
20 Warburg’s optical test
Basics of proteomics
Properties of lipids
Mitochondrial oxidation (Clark electrode)
Consultation

Seminars

Exam topics/questions

Participants
Bóna Ágnes (BOARAAO.PTE), Böddi Katalin (BOKDAA.T.JPTE), Dr. Agócs Attila (AGAQAAP.PTE), Dr. Berente Zoltán (BEZLAAP.PTE), Dr. Jakus Péter (JAPAAA.T.JPTE), Dr. Lóránd Tamás (LOTGAAO.PTE), Dr. Márk László (MALMAAO.PTE), Dr. Petrovics Dóra (PEDIAAT.PTE), Dr. Takátsy Anikó (TAAAAA.T.JPTE), Radó-Turcsi Erika Margit (RAESAAP.PTE)
**OAA-BI2: Biophysics 2**

**Course director:** DR. GÁBOR HILD, associate professor  
Department of Biophysics

<table>
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<th>3 credit • final exam • Basic module • spring semester • recommended semester: 2</th>
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<td>Number of hours/semester: 14 lectures + 28 practices + 0 seminars = total of 42 hours</td>
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<td>Course headcount limitations (min.-max.): 5 –</td>
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<td>Prerequisites: OAA-BI1 completed</td>
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**Topic**

The course, stemming from „Biophysics 1” addresses the foundations of physical and biophysical methods used for exploring biological systems particularly the human body, as well as those of physical diagnostic methods. The latter are discussed briefly with references made to a respective topical pre-clinical course.

**Conditions for acceptance of the semester**

Completion and proper documentation of each laboratory practice and approval thereof by the course instructor. Maximum 3 absences from practices. Students are not allowed to be late from the practicals. Being late counts as an absence. During the semester the students write mid-term tests. Based on the results the students can be exempted from some parts of the colloquium.

**Mid-term exams**

Making up for missed classes

Missed practices can be made up during make-up opportunities provided by the department. During each make-up lab, only one missed practice can be made up.

**Reading material**

- **Obligatory literature**
- **Literature developed by the Department**
  1. Damjanovich Sándor, Fidy Judit, Szöllösi János (eds.): Medical Biophysics, Medicina, Budapest, 2008
  2. Biophysics Laboratory Manual, Pécs University Press, Pécs
  3. Online materials on departmental website (http://biofizika.aok.pte.hu)
- **Notes**
- **Recommended literature**

**Lectures**

1. Spectrofotometry  
   Dr. Nyitrai Miklós
2. Fluorescence spectroscopy  
   Dr. Nyitrai Miklós
3. Fluorescence anisotropy, FRET  
   Dr. Nyitrai Miklós
4. Infrared and Raman spectroscopy  
   Dr. Nyitrai Miklós
5. NMR  
   Dr. Nyitrai Miklós
6. Light and fluorescence microscopy  
   Dr. Bugyi Beáta
7. Modern microscopy techniques, FRAP  
   Dr. Bugyi Beáta
8. Flow citometry  
   Dr. Bugyi Beáta
9. Sedimentation, electrophoresis  
   Dr. Bugyi Beáta
10. Mass-spectrometry  
    Dr. Bugyi Beáta
11. X-ray diagnostics, CT  
    Dr. Grama László
12. Ultrasound  
    Dr. Grama László
MRI
Dr. Grama László

Gamma-camera, SPECT, PET
Dr. Grama László

**Practices**

1. Introduction. Laboratory safety rules
2. Introduction. Laboratory safety rules
3. The Geiger-Müller counter. Radioactive half-life I
4. The Geiger-Müller counter. Radioactive half-life I
5. Gamma-absorption and spectrometry
6. Gamma-absorption and spectrometry
7. Absorption of beta-radiation, dead time. Radioactive half-life II
8. Absorption of beta-radiation, dead time. Radioactive half-life II
9. Scintigraphy
10. Scintigraphy
11. Optics. Illumination
12. Optics. Illumination
13. Make-up lab, seminar
14. Make-up lab, seminar
15. Absorption photometry
16. Absorption photometry
17. Blood pressure measurement. Electrocardiography
18. Blood pressure measurement. Electrocardiography
19. Ultrasound
20. Ultrasound
21. Temperature measurement
22. Temperature measurement
23. Audiometry
24. Audiometry
25. Make-up lab, seminar
26. Make-up lab, seminar
27. Make-up lab, seminar
28. Make-up lab, seminar

**Seminars**

**Exam topics/questions**

Can be found on the departmental website ([http://biofizika.aok.pte.hu](http://biofizika.aok.pte.hu))

**Participants**

Czimbalek Lívia Mária (CZLAAA.T.JPTE), Dr. Bódis Emőke (BOEAAD.T.JPTE), Dr. Bugyi Beáta (BUBEAB.T.JPTE), Dr. Grama László (GRLHAAO.PTE), Dr. Hild Gábor (HIGMAAO.PTE), Dr. Kengyel András Miklós (KEAFACO.PTE), Dr. Lukács András Szilárd (LUATAA0.PTE), Dr. Sza bó-Meleg Edina (MEEDAA.T.JPTE), Dr. Talián Csaba Gábor (TACRAAO.PTE), Huber Tamás (HUTEAB.T.JPTE), Huberné Barkó Szilvia (BASFAA.T.JPTE), Kollár Veronika Tünde (KOVGACT.PTE), Leipoldné Vig Andrea (VIFAAO.PTE), Tóth Mónika Ágnes (TOMIAAT.PTE), Türmer Katalin Erzsébet (TUKIAAT.PTE), Ujfalusi Zoltán (UJZDAA.T.JPTE)
OAA-MB2 | MOLECULAR CELL BIOLOGY 2  
---|---
**Course director:** | **DR. HAJNÁLKA GABRIELLA ÁBRAHÁM** associate professor  
Department of Medical Biology

4 credit • final exam • Basic module • spring semester • recommended semester: 2

**Course headcount limitations (min.-max.):** 1 –

**Number of hours/semester:** 28 lectures + 12 practices + 16 seminars = total of 56 hours

**Prerequisites:** OAA-MB1 completed

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**Topic**

To provide molecular and cellular biological basis for the teaching of anatomy, biochemistry, physiology, pathology, pathophysiology, microbiology and pharmacology. To teach students molecular cell biology facts essential for clinical subjects. Main topics: cell membrane and extracellular matrix; intracellular signal transduction; cellular and molecular mechanisms of carcinogenesis; introduction to medical genetics; molecular medicine.

The detailed list of topics will be available on the first seminar for each group.

**Conditions for acceptance of the semester**

According to the Code of Studies and Examinations

**Mid-term exams**

Making up for missed classes

Extra lab programs at the end of each practical cycle.

**Reading material**

- **Obligatory literature**

- **Literature developed by the Department**

- **Notes**
  M. Pap (editor): Molecular Cell Biology Laboratory Manual  
  Szeberényi, J., Komáromy, L.: Molecular Cell Biology Syllabus

- **Recommended literature**

**Lectures**

1. Opening lecture  
Dr. Szeberényi József
2. Passive transport processes  
Dr. Szeberényi József
3. Active transport processes  
Dr. Szeberényi József
4. Extracellular matrix  
Dr. Komáromy László
5. Signal transduction mechanisms I: Types of chemical signaling  
Dr. Szeberényi József
6. Signal transduction mechanisms II: The role of G-proteins in signaling  
Dr. Szeberényi József
7. Signal transduction mechanisms III: Growth factor signaling  
Dr. Szeberényi József
8. Signal transduction mechanisms IV: Stress signaling  
Dr. Szeberényi József
9. Signal transduction mechanisms V: Cytokine and integrin signaling  
Dr. Szeberényi József
10. Signal transduction mechanisms VI: General features of signal transduction  
Dr. Szeberényi József
11. The molecular basis of development  
ifj. Dr. Sétáló György
12. Apoptosis  
Dr. Szeberényi József
13. The tumor cell  
Dr. Komáromy László
14 DNA tumor viruses
   Dr. Komáromy László
15 RNA tumor viruses
   Dr. Komáromy László
16 Retroviral oncogenes
   Dr. Komáromy László
17 Cellular oncogenes I
   Dr. Szeberényi József
18 Cellular oncogenes II
   Dr. Pap Marianna
19 Cellular oncogenes III
   Dr. Pap Marianna
20 Tumor suppressor genes I
   Dr. Szeberényi József
21 Tumor suppressor genes II
   Dr. Szeberényi József
22 Oncogenes and the cell cycle
   Dr. Szeberényi József
23 The multistage mechanism of carcinogenesis I: Experimental carcinogenesis
   Dr. Szeberényi József
24 The multistage mechanism of carcinogenesis II: Tumor invasion and metastasis formation
   Dr. Szeberényi József
25 Closing lecture
   Dr. Szeberényi József
26 Molecular diagnostics
   Dr. Szeberényi József
27 Gene therapy
   Dr. Szeberényi József
28 Closing lecture
   Dr. Szeberényi József

Practices
1 Phase contrast microscopy. Polarisation microscopy
2 Phase contrast microscopy. Polarisation microscopy
3 Histochemistry of macromolecules
4 Histochemistry of macromolecules
5 Membrane, transport, extracellular matrix
6 Membrane, transport, extracellular matrix
7 Signal transduction. The tumor cell
8 Signal transduction. The tumor cell
9 Immunocytochemistry, immunohistochemistry
10 Immunocytochemistry, immunohistochemistry
11 Apoptosis
12 Apoptosis

Seminars
1 Cytoskeleton
2 Membrane
3 Transport
4 Extracellular matrix
5 Types of chemical signaling. Receptors. The cAMP pathway
6 TEST: Cytoskeleton. Membrane, transport, extracellular matrix.
7 Signal transduction mechanisms: the phospholipase C pathway. Growth factor and cytokine signaling
8 Developmental biology. Apoptosis. The tumor cell
9 TEST: Signal transduction processes
10 Tumor viruses
11 Retroviral oncogenes. Cellular oncogenes
12 Tumor suppressor genes. Oncogenes and the cell cycle. The multistage mechanism of carcinogenesis
14 Molecular medicine
15 SEMESTER TEST
16 SEMESTER TEST

Exam topics/questions

Theoretical examination questions

1. Proteins
2. Lipids
3. Carbohydrates
4. Nucleosides, nucleotides
5. The structure of DNA
6. Experiments proving that DNA is the genetic material
7. The structure and types of RNA
8. Comparison of pro- and eukaryotic cells
9. Methods of immunocytochemistry
10. Restriction endonucleases
11. Southern blotting
12. DNA sequencing
13. DNA chips
14. Genomic libraries
15. Polymerase chain reaction
16. Transgenic organisms
17. Targeted gene inactivation
18. Inhibition of gene expression at the level of mRNA
19. cDNA libraries
20. Northern blotting
21. Immunoprecipitation and Western blotting
22. The structure of cell nucleus
23. The organisation of chromatin
24. Unique and repetitive sequences
25. The chemical composition of chromatin
26. The phases of cell cycle
27. The regulation of cell cycle
28. Mitosis
29. Meiosis
30. General features of replication
31. The mechanism of replication in prokaryotes
32. Eukaryotic replication
33. DNA repair
34. The mechanism of prokaryotic transcription
35. General features of eukaryotic transcription
36. Synthesis and processing of eukaryotic pre-rRNA
38. Pre-mRNA splicing
39. Synthesis of aminoacyl-tRNA
40. The structure and function of ribosomes
41. The genetic code
42. Initiation of translation
43. Elongation and termination of translation
44. General features of translation
45. The lactose operon
46. The tryptophan operon
47. Cloning by nuclear transplantation
48. Regulation of pre-mRNA synthesis and processing in eukaryotes
49. Regulation of mRNA transport, translation and degradation in eukaryotes
50. Regulation of protein activity and degradation in eukaryotes
51. Eukaryotic transcription factors
52. The mechanism of action of steroid hormones
53. Rough endoplasmic reticulum
54. Golgi complex. Protein glycosylation
55. The mechanism of secretion
56. Endocytosis
57. The mechanism of vesicular transport
58. Lysosomes. Smooth endoplasmic reticulum
59. Oxygen free radicals. Membrane damage. Lipid peroxidation
60. The structure and function of mitochondria
61. The genetic apparatus of mitochondria
62. Mitochondrial diseases
63. Microtubules
64. Microfilaments
65. Intermediate filaments
66. The cell membrane
67. Cell junctions
68. Passive transport
69. Active transport
70. The extracellular matrix
71. Types of chemical signaling
72. cAMP-mediated signal transduction
73. Phospholipid-derived second messengers
74. Growth factor signaling
75. Cytokine signaling
76. Stress signalling
77. Cell-matrix connections. Integrin signaling
78. TGF-beta, Wnt, Notch, Hedgehog signaling
79. The role of protein kinases in cell regulation
80. Signal amplification. Signal termination. Signaling networks
81. Molecular basis of development
82. The physiological and pathological role of apoptosis
83. The mechanism of apoptosis
84. General features of the tumour cell
85. Oncogenic DNA viruses
86. Retroviruses
87. Retroviral oncogenes
88. Identification of cellular oncogenes by gene transfer
89. Oncogenesis by weakly transforming retroviruses
90. Mechanisms of cellular oncogene activation
91. General features of tumour suppressor genes
92. Rb and p53 proteins
93. The role of tumour suppressor genes in Wilms tumour, neurofibromatosis, colon and breast cancer
94. The role of oncogenes in cell cycle regulation
95. Phases of experimental carcinogenesis
96. Steps of carcinogenesis in naturally occurring tumors
97. Molecular diagnosis of inherited diseases
98. Molecular diagnosis of tumors and infectious diseases
99. Methods of gene transfer
100. Human gene therapy

Participants
Dr. Ábrahám Hajnalka Gabriella (ABHMAAO.PTE), Dr. Bátor Judit (BAJFAAO.PTE), Dr. Berta Gergely (BEGFADO.PTE), Dr. Fekete Zsuzsanna (FEZAAB.T.JPTE), Dr. Galgóczi Szilvia (GASPABO.PTE), Dr. Pap Marianna (PAMFAAO.PTE), ifj. Dr. Sétáló György (SEGMAAO.PTE), Kiss Katalin (KIKFABO.PTE), Németh Mária (NEMGAAT.PTE), Varga Judit (VAJFACT.PTE)
OAA-SF1 HISTOLOGY AND EMBRYOLOGY 1

Course director: DR. JUDIT HORVÁTH, associate professor
Department of Anatomy

4 credit • semester exam • Basic module • spring semester • recommended semester: 2

Number of hours/semester: 28 lectures + 28 practices + 0 seminars = total of 56 hours
Course headcount limitations (min.-max.): 5 – 260
Prerequisites: OAA-AA1 parallel + OAA-MB1 completed

Topic

Basic histology (tissues). Basic embryology (embryogenesis). Microscopic and ultrastructural composition of the basic tissues. Early development of the human body, embryogenesis, external appearance of the fetus. This is the first part of a two-semester subject.

Histology is important to understand normal physiological processes on microscopic level and to explain pathological changes in diseases. Embryology helps to explain the normal anatomical situs and certain malformations, syndromes.

Conditions for acceptance of the semester

In the histology practices, the students must prepare a histology notebook (Histology-1 notebook) with the drawings of every slide studied during the semester. The notebook will be double-checked and signed by the practice leader at the end of the semester. Presence on at least 85% of course hours is required. Absence (for any reason) is max. 8 teaching hours (= 8x45 min.) including max. 5 practice hours.

Mid-term exams

Making up for missed classes

Exceptionally, students may attend the class of another group (strictly on the same week, twice in a semester).

Reading material

- Obligatory literature
  http://an-server.pote.hu/INFO/elrod.htm
- Literature developed by the Department
  http://an-server.pote.hu
- Notes
- Recommended literature

Lectures

1. Introduction to histology. Microscopic techniques. Basic tissue types.
   Dr. Horváth Judit
2. Epithelial tissues.
   Dr. Csernus Valér
3. Surface epithelia
   Dr. Csernus Valér
4. Glandular epithelia
   Dr. Csernus Valér
5. Connective tissue cells
   Dr. Csernus Valér
6. Fibers and ground substance of connective tissue.
   Dr. Tamás Andrea
7. Types of connective and supportive tissues.
   Dr. Csernus Valér
8. Histology of the cartilages
   Dr. Csernus Valér
9. Bone tissues. Intramembranous bone formation
   Dr. Csernus Valér
10. Intracartilaginous bone formation
    Dr. Csernus Valér
11. Muscle tissues 1
    Dr. Csernus Valér
12. Muscle tissues 2
    Dr. Csernus Valér
13 Progenesis I  
Dr. Horváth Judit  

14 Nerve tissue 1  
Dr. Gaszner Balázs  

15 Progenesis II  
Dr. Horváth Judit  

16 Nerve tissue 2  
Dr. Gaszner Balázs  

17 Fertilization, cleavage. Homebox genes.  
Dr. Horváth Judit  

18 Blood and blood cells  
Dr. Csernus Valér  

19 Blastocyst formation, implantation.  
Dr. Horváth Judit  

20 Haematopoiesis  
Dr. Csernus Valér  

21 Gastrulation and neurulation. Determination of the body axes  
Dr. Horváth Judit  

22 Histology of blood vessels  
Dr. Csernus Valér  

23 Differentiation of the mesoderm, development of the muscular system.  
Dr. Horváth Judit  

24 Review of basic tissues.  
Dr. Horváth Judit  

25 Flexion of the embryo. The umbilical cord  
Dr. Horváth Judit  

26 Fetal membranes, decidua, placenta  
Dr. Horváth Judit  

27 The external appearance of the embryo. Development of the skull.  
Dr. Horváth Judit  

28 Malformations and twinnings.  
Dr. Horváth Judit  

Practices  
1 Basic histological techniques. Use of the microscope.  

2 Basic histological techniques. Use of the microscope.  

3 Simple epithelia  

4 Simple epithelia  

5 Columnar epithelia  

6 Columnar epithelia  

7 Stratified epithelia, transitional epithelium, pigmented epithelium  

8 Stratified epithelia, transitional epithelium, pigmented epithelium -  

9 Glandular epithelia  

10 Glandular epithelia  

11 Cells and fibers of the connective tissue  

12 Cells and fibers of the connective tissue  

13 Types of the connective tissues  

14 Types of the connective tissues  

15 Histology of the cartilage and the bone  

16 Histology of the cartilage and the bone  

17 Bone formation  

18 Bone formation  

19 Histology of the muscle tissues  

20 Histology of the muscle tissues  

21 Nerve tissue  

22 Nerve tissue  

23 Blood cells. Haemopoiesis  

24 Blood cells. Haemopoiesis  

25 Histology of the blood vessels.  

26 Histology of the blood vessels
27 Embryology seminar
28 Embryology seminar

Seminars

Exam topics/questions

http://an-server.pote.hu

Participants

Dr. Csernus Valér (CSVGAO.PTE), Dr. Gaszner Balázs (GABFAO.PTE), Dr. Hollósy Tibor (HOTFAAO.PTE), Dr. Horváth Gábor (HOGNAAO.PTE), Dr. Horváth Judit (HOJIAAO.PTE), Dr. Kiss Péter (KIPFABO.PTE), Dr. Kovács Magdolna (KOMLAAO.PTE), Dr. Kvárik Timea (KVTOAA-O.PTE), Dr. Mammel Barbara (MABMAAB.PTE), Dr. Pethőné Dr. Lubics Andrea (PELMAAO.PTE), Dr. Reglődi Dóra (REDMAAO.PTE), Dr. Rékási Zoltán (REZMAAO.PTE), Dr. Sétáló György (SEGGAO.PTE), Dr. Tamás Andrea (TAAFAAO.PTE), Dr. Timás Andrea (TILGAO.PTE), Kovács László Ákos (KOLQAAO.PTE), Opper Balázs (OPBFAB.TJPTE)
**OAR-APG**  
**SUMMER PRACTICE IN HOSPITAL CARE**

**Course director:** DR. ANDRÁS OLÁH, associate professor  
Faculty of Health Sciences - Institute of Health Science, Department of Public Health

<table>
<thead>
<tr>
<th>0 credit • signature • Criterion requirement module • spring semester • recommended semester: 2</th>
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</thead>
<tbody>
<tr>
<td><strong>Number of hours/semester:</strong> 0 lectures + 90 practices + 0 seminars = total of 90 hours</td>
</tr>
<tr>
<td><strong>Course headcount limitations (min.-max.):</strong> 1 - 2</td>
</tr>
<tr>
<td><strong>Prerequisites:</strong> no prerequisites</td>
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</tbody>
</table>

**Topic**

Within the framework of the course students learn the fundamental nursing skills, which can be utilized by them during training and their later work. They get insight into the fundamentals of nursing science, into the various functions performed by nurses with various qualifications. They learn the functioning of hospitals, the course of patient care, the framework for care, they can acquire the theoretical and practical fundamentals of daily non-invasive and invasive procedures that are essential to the skill level of the knowledge of patient care.

**Conditions for acceptance of the semester**

- No absences allowed
- Mid-term exams
- Making up for missed classes
- None

**Reading material**

- **Obligatory literature**

- **Literature developed by the Department**

- **Notes**

- **Recommended literature**
  Potter, Perry: Fundamentals of Nursing, 2001
  Elkin, Perry, Potter: Clinical Nursing Skills and Techniques, 2002

**Lectures**

**Practices**

1-90  Nursing practice at an adult inpatient care unit.

**Seminars**

**Exam topics/questions**

**Participants**

Dr. Oláh András (OLAGAAE.PTE)
OAR-API

NURSING SKILLS THEORY - HOSPITAL CARE

Course director: DR. ANDRÁS OLÁH, associate professor
Faculty of Health Sciences - Institute of Health Science, Department of Public Health

0 credit • signature • Criterion requirement module • spring semester • recommended semester: 2
Number of hours/semester: 7 lectures + 7 practices + 0 seminars = total of 14 hours
Course headcount limitations (min.-max.): 5 – 200
Prerequisites: no prerequisites

Topic
Within the framework of the course students learn the fundamental nursing skills, they learn the functioning of hospitals, the course of patient care, the framework for care, they can acquire the theoretical and practical fundamentals of daily non-invasive and invasive procedures that are essential to the skill level of the knowledge of patient care. The course emphasis is placed during the demonstration classroom environments using mulage-s demonstration and practice.

Conditions for acceptance of the semester
Maximum of 25% absence
Written test, its result has to be min. 60%
Mid-term exams
Making up for missed classes
With an other group if the increase of the group’s size is no more than 10%

Reading material
- Obligatory literature
- Literature developed by the Department
- Notes
- Recommended literature
  Potter, Perry: Fundamentals of Nursing, 2001
  Elkin, Perry, Potter: Clinical Nursing Skills and Techniques, 2002

Lectures
1 Vital signs: blood pressure (blood pressure measurement devices, steps of the blood pressure measurement), temperature (nursing aspects of the care of hypothermia, hyperthermia and fever, physical fever reduction methods, types of thermometers, areas of temperature measurement), breathing (determination of the breathing and its main aspects), pulse (pulse rate determination, qualities of the pulse, sites of the pulse determination, monitoring systems)
  Fullér Noémi
2 Infusion therapy (types of the i.v. catheters, nursing interventions related to canules, main features of the active and passive safety systems, infusion tubing systems, infusion pumps)
  Fullér Noémi
3 Basics of medication (forms of medicine, per oral administration, otological treatment, vaginal treatment, nasal administration, ophthalmologic treatment, rectal treatment, transdermal patches; parenteral administration, equipment for the injection, features of the intracutaneous, subcutaneous, intramuscular and intravenous injections)
  Fullér Noémi
4 Oxygen therapy (oxygen delivery devices, low flow devices, high flow devices, oxygen resources, inhalation therapy). The need to urinate (general observational duties, urine sampling forms, types of the bladder catheters, promoting urine capture)
  Fullér Noémi
5 The general structure of hospitals, the set-up of in-patient departments, their operating schedule, presentation of primary care tools. Nutritional needs, nutritional support (main aspects of enteral and parenteral nutritional support, applying nasogastric feeding tube); Blood sampling
  Fullér Noémi
6 Defecation (general observational duties, stool sampling forms, types of enema and their main features). Hygienic nursing, Immobilization, decubitus-prevention and care
  Fullér Noémi
7 Written test
  Fullér Noémi
Practices

1. Measurement of vital parameters, Hygienic hand disinfection, alcoholic hand scrub, Tools of taking blood pressure, definition of blood pressure with auscultation method, definition of systolic pressure with palpation
2. Invasive interventions during care, Blood collection process (needed equipment, closed sampling system, features of the specimen tubes, process of vein selection, the process of the puncture, care of puncture site)
3. Peripheral short catheter insertion, process of the vein selection, care of the puncture site, observational and caring duties, i.v. injection via short catheter, rinse of the catheter
4. Injection: Subcutaneous injection: related tools (pre and not-pre-filled syringes: definition of sites of administration, the injection technique; intramuscular injection: associated tools, definition of sites of administration (ventrogluteal and dorsogluteal region, delta muscle, rectus femoris, vastus lateral), advantages disadvantages, injection technique; Intravenous injection associated tools, definition of sites of administration, process of vein selection, injection technique
5. Infusion therapy: venting the infusion tubing, administration of infusion, administration of medicines to a basic solution
6. Other interventions: Bladder catheterization process (male and female), the proper usage of the needed tools, the weaning process
7. Other interventions: provide evacuant enema, skyballum removal, performing 12-lead ECG (knowledge of the leads, points of the placements)

Seminars

Exam topics/questions

Participants

Fullér Noémi (FUNNAE.PTE)
OAR-OKG  
**SUMMER PRACTICE IN MEDICAL COMMUNICATION SKILLS**

**Course director:**  
DR. SÁNDOR BALOGH, associate professor  
Family Medicine Institute

- 0 credit  
- signature  
- Criterion requirement module  
- spring semester  
- recommended semester: 2

**Number of hours/semester:**  
0 lectures + 30 practices + 0 seminars = total of 30 hours

**Course headcount limitations (min.-max.):**  
1 – 1  
Prerequisites: OAA-OKG parallel

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**Topic**

The practice with a GP (5 days/week x 6 hours/day x 1 week = 30 hours) can be completed in the praxis of the doctors.

**Conditions for acceptance of the semester**

After its completion, we require feedback both from the mentors and the students. Students need to complete 2 interview questionnaires.

The practice can be spent in a foreign country, but the student is required to speak the language of the host country.

1) The Doctor-Patient Communication Practice is one week PRACTICE during the summer holiday (either in July or August)
2) It’s very advisable to spend it in your country (you should be able to speak to the patients)
3) It’s better to do it right after the first year (later it’s more complicated)
4) We also send a short letter about the practice to the doctors who accept you.
5) The aim is to give you some impression about Doctor-Patient Encounter (try to speak, to ask, to conform patients, maybe do some simple examination if it’s permitted and also watch, how other doctors do it)
6) You’ll have 2 interviewing forms, what you have to fill out and send back to our office with the feedbacks both from you and from your doctor
7) This will prove that you did the practice so the department can accept your semester.
8) 1 doctor can teach 1 student at the same time.

**Mid-term exams**

None

**Making up for missed classes**

None

**Reading material**

- **Obligatory literature**
  - János Pilling: Medical Communication, Medicina Publishing House, 2011  

- **Literature developed by the Department**

- **Notes**

- **Recommended literature**
  - János Pilling: Medical Communication, Medicina Publishing House, 2011  

**Lectures**

**Practices**

1. Introduction of the praxis
2. Introduction of the team
3. The Role and the Place of the Student in the Practice
4. Methods of the Administration
5. Administration in Practice
6. Introduction of the praxis
7. The role and the place of the students in the office
8. The most Common Problems of the Patients
9. Different Situations in the Office
10. Interviewing Patients
11. Collecting Present Complaints
12. About Past Medical History
The Patient’s Living Circumstances
Risk Factors
Collecting Data from the Patients
Basic physical examinations
Practicing Basic Physical Examinations
Collecting main Symptoms
Evaluating Symptoms
Making Conclusion and Offering a Plan to the Patients
Different Situations with Different Patients
Different Situations with Different Patients
Difficult Patients
Visit the Patient at Home
Making the first Interview
Evaluation of the First Interview
Making the Second Interview
Evaluation of the Second Interview
Evaluation of Experiences
Evaluation and Summary of the Program, Feedback

Seminars
Exam topics/questions
Participants
Dr. Bán Ildikó (BAIFAC0.PTE), Dr. Somogyi Lászlóné (SOLTA0.PTE), Várboróné Dr. Csikós Ágnes (VACTAB0.PTE)
Anatomy-2 involves the macroscopic structure of the human body including its functional aspects. This is the second part of a two-semester subject. Students get insight into the macroscopic structure of viscera. Anatomy-2 is completed by a semester exam.

Conditions for acceptance of the semester

Presence on at least 85% of course hours is required. Absence (for any reason) is max. 11 teaching hours (= 11x45 min.) including max. 9 practice hours.

Mid-term exams

Making up for missed classes

Exceptionally, students may attend the lab of another group (on the same week), maximum two labs in a semester.

Reading material

- Obligatory literature
- Literature developed by the Department
  http://an-server.pote.hu
- Notes
- Recommended literature

Lectures

   Dr. Tóth Pál
2. Respiratory system. Larynx and phonation.
   Dr. Rékási Zoltán
   Dr. Rékási Zoltán
4. Gross anatomy of the heart, cardiac cavities and valves.
   Dr. Gaszner Balázs
5. Vascular supply and conducting system of the heart. Clinical considerations.
   Dr. Donauer Elemér
   Dr. Tamás Andrea
   Dr. Csernus Valér
8. Topography, section and structure of the kidneys.
   Dr. Csernus Valér
9. Retroperitoneum.
   Dr. Rékási Zoltán
10. Gross anatomy of the male reproductive system.
    Dr. Tamás Andrea
11. Gross anatomy of the male reproductive system.
    Dr. Rékási Zoltán
    Dr. Koppán Miklós Endre
13. Obstetrical and gynecological correlates of the genital organs and perineum.
    Dr. Koppán Miklós Endre
14. Vascular supply and lymphatic drainage of the gastrointestinal tract. The vascular anastomoses and their clinical importance.
    Dr. Szántó Zalán János
Practices

1. Oral cavity and teeth 1.
2. Oral cavity and teeth 1.
5. Pharynx; Retro- and parapharyngeal spaces 1.
6. Pharynx; Retro- and parapharyngeal spaces 2.
7. Larynx 1.
8. Larynx 2.
10. Structure of the chest wall. Intercostal nerves and vessels 2.
13. Term and division of the mediastinum.
15. Anterior mediastinum 2.
17. Cavities, valves and vascular supply of the heart 1.
18. Cavities, valves and vascular supply of the heart 2.
19. Lungs and bronchi 1.
20. Lungs and bronchi 2.
22. Posterior mediastinum 2.
23. Posterior mediastinum 3.
25. Structure of the abdominal wall (repetition).
27. Hepatoduodenal ligament 1.
29. Coeliac trunk.
30. Topography, vascular supply and lymphatic drainage of the stomach.
31. Topography, vascular supply and lymphatic drainage of duodenum and spleen.
32. Topography, surfaces, and peritoneal relations of liver.
33. Topography and vascular supply of pancreas 1.
34. Topography and vascular supply of pancreas 2.
35. Vascular supply and lymphatic drainage of the small and large intestines 1.
36. Vascular supply and lymphatic drainage of the small and large intestines 2.
37. Topography of kidneys.
38. Section of the kidney.
40. Removal of the bowels 2.
41. Retroperitoneum.
42. Paired branches of the abdominal aorta.
43. Lumbar plexus.
44. Diaphragm.
45. Topography of the true pelvis.
46. Branches of the internal iliac artery. Sacral plexus.
47. Male and female reproductive organs 1.
49. Median sagittal sections of the male and female pelvis 1.
50. Median sagittal sections of the male and female pelvis 2.
51. Perineum, external genital organs 1.
52. Perineum, external genital organs 2.
53. Recapitulation 1.
54. Recapitulation 2.
55. Recapitulation 3.
56. Recapitulation 4.
Seminars

Exam topics/questions

http://an-server.pote.hu

Participants

Dr. Csernus Valér (CSVGAO.PTE), Dr. Farkas József (FAJHAO.PTE), Dr. Gaszner Balázs (GABFAO.PTE), Dr. Hollósy Tibor (HOTFAO.PTE), Dr. Horváth Gábor (HOGNAO.PTE), Dr. Horváth Judit (HOJIAO.PTE), Dr. Horváth-Opper Gabriella (HOGFAO.PTE), Dr. Kiss Péter (KIPFAO.PTE), Dr. Kvárik Timea (KVTOA-O.PTE), Dr. Nagy András Dávid (NAFAFO.PTE),
Dr. Pethő Dr. Lubics Andrea (PELMAAO.PTE), Dr. Rékási Zoltán (REZMAO.PTE), Dr. Tóth Pál (TOPMAO.PTE), Fábián Eszter (FAEGAAT.PTE), Kovács László Ákos (KOLQAAO.PTE)
The subject gives an overview of the molecular processes occurring in living organisms from two major aspects. On the one hand, following the subject „Introduction to Biochemistry”, it describes the metabolism of the four major types of biomolecules (carbohydrates, lipids, amino acids/proteins and nucleotides/nucleic acids) along with the indirect enzymatic regulation of these processes. On the other hand, built on the subject „Molecular Cell Biology”, accounts for the molecular processes responsible for the transmission of information within the living organisms from molecular biological (DNA-RNA-protein-metabolite) as well as hormonal point of view.

The subject lies down the foundations of the subjects Medical Biochemistry, Pharmacology and Clinical Chemistry.

Conditions for acceptance of the semester

Requirements of the acceptance of Biochemistry course are the following:

- No more than three absences from the laboratory practices
- Submission of at least 10 out of 12 short tests held in the first 10 minutes of the practices
- Achieving satisfactory level in at least seven of the 12 short tests

Mid-term exams

Making up for missed classes

Permission should be asked from the course director to make up the practice with another group. Permission will be given maximum 2 times.

Reading material

- Obligatory literature

- Literature developed by the Department
  See CooSpace

- Notes

- Recommended literature

Lectures

1. Introduction. The pentose phosphate pathway
   Dr. Berente Zoltán

2. Photosynthesis, light reaction; glucose synthesis in plants
   Dr. Veres Balázs

3. Gluconeogenesis in animal cells
   Dr. Kovács Krisztiina

4. Glycogen synthesis and degradation
   Dr. Veres Balázs

5. Regulation of glycogen synthesis and degradation
   Dr. Veres Balázs

6. Regulation and disorders of carbohydrate metabolism
   Dr. Kovács Krisztiina

7. Fatty acid synthesis (with elongation and desaturation)
   Dr. Gallyas Ferenc

8. Synthesis of complex lipids
   Dr. Gallyas Ferenc
9 Structure and biological activities of steroids
   Dr. Gallyas Ferenc

10 Synthesis of cholesterol and ketone bodies
   Dr. Gallyas Ferenc

11 Regulation and disorders of lipid metabolism
   Dr. Gallyas Ferenc

12 Amino acid metabolism; the fate of the amino group
   Dr. Debreceni Balázs

13 Urea cycle
   Dr. Debreceni Balázs

14 Amino acid metabolism; the fate of the carbon skeleton
   Dr. Debreceni Balázs

15 Synthesis of non-essential amino acids
   Dr. Debreceni Balázs

16 Enzymopathies of amino acid metabolism
   Dr. Debreceni Balázs

17 Synthesis of biologically active molecules from amino acids
   Dr. Debreceni Balázs

18 Synthesis of purine and pyrimidine nucleotides
   Marquettené Dr. Bock Ildikó

19 Degradation of purine and pyrimidine nucleotides
   Marquettené Dr. Bock Ildikó

20 Genes and chromosomes
   Dr. Sümegi Balázs

21 DNA replication
   Dr. Sümegi Balázs

22 DNA repair
   Dr. Sümegi Balázs

23 RNA metabolism 1
   Dr. Veres Balázs

24 RNA metabolism 2
   Dr. Veres Balázs

25 Short RNA molecules
   Dr. Veres Balázs

26 Retroviruses
   Dr. Veres Balázs

27 Protein synthesis 1. Participants and mechanism
   Dr. Berente Zoltán

28 Protein synthesis 2. Regulation, posttranslational modifications
   Dr. Berente Zoltán

29 Protein folding, chaperones
   Dr. Berente Zoltán

30 Protein targeting and vesicular transport of proteins
   Dr. Berente Zoltán

31 Intracellular proteolysis
   Dr. Sümegi Balázs

32 Regulation of gene expression 1
   Dr. Sümegi Balázs

33 Regulation of gene expression 2
   Dr. Sümegi Balázs

34 Mitochondrial protein synthesis, mitochondrial genome
   Dr. Sümegi Balázs

35 Recombinant DNA technologies
   Dr. Debreceni Balázs

36 Hormones 1
   Dr. Tapodi Antal

37 Hormones 2
   Dr. Tapodi Antal
38 Serum lipoproteins
   Dr. Debreceni Balázs
39 Special functions of the liver
   Dr. Veres Balázs
40 Metabolic changes when switching from fed to fasting state
   Dr. Gallyas Ferenc
41 Proteins and biochemistry of the immune system
   Dr. Kovács Krisztina
42 Molecular mechanisms of allergic reactions
   Dr. Kovács Krisztina

Practices
1 Preparation of buffer solutions
2 Preparation of buffer solutions
3 Basic biochemical laboratory techniques
4 Basic biochemical laboratory techniques
5 Inorganic phosphate requirement of glycolysis
6 Inorganic phosphate requirement of glycolysis
7 Concerted regulation of carbohydrate metabolism
8 Concerted regulation of carbohydrate metabolism
9 Exploration of the contents of a cell, subcellular fractionation
10 Exploration of the contents of a cell, subcellular fractionation
11 Concerted regulation of lipid metabolism
12 Concerted regulation of lipid metabolism
13 Determination of protein concentration
14 Determination of protein concentration
15 Mitochondrial oxidation; Clark electrode
16 Mitochondrial oxidation; Clark electrode
17 Affinity chromatography; Study of Complex I and III
18 Affinity chromatography; Study of Complex I and III
19 Inborn Errors of Metabolism I
20 Inborn Errors of Metabolism I
21 Student presentations
22 Student presentations
23 Inborn Errors of Metabolism II
24 Inborn Errors of Metabolism II
25 Study of chaperone function
26 Study of chaperone function
27 Consultation, student presentations
28 Consultation, student presentations

Seminars

Exam topics/questions
The list of topics of the exam questions will be uploaded to CooSpace.
The exams, including the retaken exams are written exams of 27 open questions. Failure to answer more than two of the first 7 questions will automatically result in „failed” grade.
Further exam points can be achieved by oral presentations during the semester.

Participants
Dr. Berente Zoltán (BEZLAAP.PTE), Dr. Debreceni Balázs (DEBFAAO.PTE), Dr. Farkas Viktória (FAVSAAP.PTE), Dr. Jakus Péter (JAPAAA.T.JPTE), Dr. Lengyel Anna (LEAFABO.PTE), Dr. Takátsy Anikó (TAAAAA.T.JPTE), Dr. Tapodi Antal (TAAAAB.T.JPTE), Dr. Veres Balázs (VEBAAB.T.JPTE), Hocsák Enikő (HOEFAB.T.JPTE), Marquettené Dr. Bock Ildikó (MABUAAP.PTE), Nagyné Dr. Kiss Gyöngyi (KIGFAFO.PTE)
OAA-EL1  Physiology 1

Course director: DR. ZOLTÁN KARÁDI, professor
Department of Physiology

9 credit • semester exam • Basic module • autumn semester • recommended semester: 3

Number of hours/semester:
70 lectures + 56 practices + 0 seminars = total of 126 hours

Course headcount limitations (min.-max.): 5 –

Prerequisites: OAA-BI2 completed + OAA-MB2 completed + OAA-OK2 completed

Topic
The most important mission of the Physiology Course in medical education is to familiarize students with the attributes of healthy functions of the living organism.

While acquiring knowledge about the most important functional characteristics of the human body the students can rely on their prior studies in biology, biophysics, chemistry-biochemistry and anatomy.

During the semester we introduce the most important elements of functioning of the organs and organ systems, as well as their cooperation also required to adapting to the environment, and the factors affecting these processes.

Special emphasis is placed on the neural and humoral regulatory processes of these life-functions, which are vital to maintain and preserve the homeostasis of the organism.

With the transfer of all this knowledge we would like to mould a holistic attitude and thinking of students, which will enable them to better understand the functions of the now healthy, however, later dysfunctional human organism.

Conditions for acceptance of the semester
Maximum of 15% absence allowed

Mid-term exams
Writing of the mid-term test on the 11th week Friday at 4 P.M. is not obligatory, thus students must sign up for it. The theoretical and lab practice material of the 1st-10th educational weeks will be covered. With good results here, bonus points can be gained that will be added to the points of the semester exam. Students with bonus points are not required to take the oral student lab report on the 14th week to have the semester signed (A chance). To have the semester signed; students must take the oral student lab report on the 14th week according to the timetable schedule of the group’s lab practices. These two retake possibilities (B and C chances) will be provided to each group during the first and second halves of the 14th week. The student’s lab notebook and filled-up Worksheets must be presented here. Students with too many lab absences (namely O,A,D 5-6-7, F,S,Z 3-4 and G,P 3-4) have to answer one additional question correctly at the oral student lab report

Making up for missed classes
The missed lab practice is advised to be covered by joining another group while the same topic is on schedule.

Reading material
- Obligatory literature

- Literature developed by the Department
  Figures of the lectures given are available on the homepage of Institute of Physiology and on the CooSpace.
  Important messages on new information will be announced at the lectures and will be sent to you by course mails.
  Please always find the current updated information and study materials on the homepage of the Institute of Physiology (physiology.aok.pte.hu).

- Notes
  Homepage of PTE ÁOK Institute of Physiology: Physiology Lab Practices 1, internet study material, printable notebook, 2014
  Homepage of PTE ÁOK Institute of Physiology: Physiology Lab Practice Worksheets 1, internet study material, printable notebook, 2014

- Recommended literature
  Fonyó: Principles of Medical Physiology, Medicina Publishing, 2002
  J.B. West (ed.): Best and Taylor’s Physiological Basis of Medical Practice, Williams and Wilkins, 1998
Lectures

1. Introduction. The concept of homeostasis. The significance of physiology in medicine.
   Dr. Karádi Zoltán

   Dr. Környei József László

3. Elementary mechanisms of excitable tissue actions I. Membrane potential.
   Dr. Jandó Gábor

4. Elementary mechanisms of excitable tissue actions II. Action potential.
   Dr. Jandó Gábor

5. Elementary mechanisms of excitable tissue actions III. Muscle functions. The electromechanical coupling.
   Dr. Ábrahám István Miklós

6. Fluid compartments of the body. The blood.
   Dr. Vértes M Marietta

7. Anorganic and organic blood constituents
   Dr. Vértes M Marietta

   Dr. Vértes M Marietta

9. Physiological role of leukocytes I
   Dr. Vértes M Marietta

10. Physiological role of leukocytes II
    Dr. Vértes M Marietta

11. Mechanism of blood coagulation I
    Dr. Környei József László

12. Mechanism of blood coagulation II
    Dr. Környei József László

13. AB0 and Rh blood types
    Dr. Környei József László

14. The cardiac cycle. Generators and conductors of impulses in the heart
    Dr. Lénárd László I

15. Electrocardiogram I
    Dr. Lénárd László I

16. Electrocardiogram II
    Dr. Lénárd László I

17. Mechanical activity of the heart. Heart sounds.
    Dr. Vértes Zsuzsanna

18. Cardiac output and cardiac work
    Dr. Vértes Zsuzsanna

19. Principles of hemodynamics
    Dr. Környei József László

20. Blood pressure. Arterial pulse
    Dr. Környei József László

21. Circulation through the capillaries
    Dr. Jandó Gábor

22. Circulation in the veins. The formation, pressure and flow of lymph
    Dr. Jandó Gábor

23. Pulmonary circulation, cerebral circulation.
    Dr. Lénárd László I

    Dr. Ábrahám István Miklós

25. Neural and humoral regulatory mechanisms of the cardiovascular system
    Dr. Lénárd László I

26. Homeostatic regulation of the cardiovascular system
    Dr. Lénárd László I

27. Mechanics of respiration. Intrathoracic pressure changes. Functions of airways
    Dr. Lénárd László I

28. Compliance. Respiratory volumes and capacities. The work of respiration
    Dr. Lénárd László I
<table>
<thead>
<tr>
<th>No.</th>
<th>Subject</th>
<th>Instructor</th>
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<tbody>
<tr>
<td>29</td>
<td>Gaseous exchange in the lungs and tissues</td>
<td>Dr. Lénárd László I</td>
</tr>
<tr>
<td>30</td>
<td>Chemical control of respiration</td>
<td>Dr. Lénárd László I</td>
</tr>
<tr>
<td>31</td>
<td>O2 and CO2 transport mechanism and pH regulation</td>
<td>Dr. Lénárd László I</td>
</tr>
<tr>
<td>32</td>
<td>Neural regulatory mechanisms of respiration</td>
<td>Dr. Lénárd László I</td>
</tr>
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<td>33</td>
<td>Mechanisms of acclimatization</td>
<td>Dr. Lénárd László I</td>
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<tr>
<td>34</td>
<td>The gastrointestinal tract. Function and control of salivary secretion</td>
<td>Dr. Lénárd László I</td>
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<tr>
<td>35</td>
<td>The stomach. Gastric secretion</td>
<td>Dr. Vértes M Marietta</td>
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<tr>
<td>36</td>
<td>Duodenal processes. Biliary secretion</td>
<td>Dr. Buzásné Dr. Telkes Ildikó</td>
</tr>
<tr>
<td>37</td>
<td>Secretion and absorption in the small intestine</td>
<td>Dr. Buzásné Dr. Telkes Ildikó</td>
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<tr>
<td>38</td>
<td>Liver functions I</td>
<td>Dr. Vértes M Marietta</td>
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<tr>
<td>39</td>
<td>Liver functions II</td>
<td>Dr. Vértes M Marietta</td>
</tr>
<tr>
<td>40</td>
<td>Secretion and absorption in the large intestine. Formation of the feces</td>
<td>Dr. Környei József László</td>
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<tr>
<td>41</td>
<td>Humoral and neural control of the gastrointestinal system</td>
<td>Dr. Vértes M Marietta</td>
</tr>
<tr>
<td>42</td>
<td>The fate of foodstuffs in the body. Vitamins</td>
<td>Dr. Környei József László</td>
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<tr>
<td>43</td>
<td>Dynamics of glomerular filtration. Plasma clearance</td>
<td>Dr. Lénárd László I</td>
</tr>
<tr>
<td>44</td>
<td>Renal blood flow. Extraction ratio. Filtration fraction</td>
<td>Dr. Környei József László</td>
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<tr>
<td>45</td>
<td>Renal circulation</td>
<td>Dr. Környei József László</td>
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<td>46</td>
<td>The renin-angiotensin system</td>
<td>Dr. Környei József László</td>
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<tr>
<td>47</td>
<td>Tubular processes I</td>
<td>Dr. Ábrahám István Miklós</td>
</tr>
<tr>
<td>48</td>
<td>Tubular processes II</td>
<td>Dr. Ábrahám István Miklós</td>
</tr>
<tr>
<td>49</td>
<td>Concentrating and diluting mechanisms. Osmoregulation</td>
<td>Dr. Ábrahám István Miklós</td>
</tr>
<tr>
<td>50</td>
<td>Fluid volume regulation of the body. The mechanisms of urination</td>
<td>Dr. Ábrahám István Miklós</td>
</tr>
<tr>
<td>51</td>
<td>Acid-base regulation I</td>
<td>Dr. Jandó Gábor</td>
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<tr>
<td>52</td>
<td>Acid-base regulation II</td>
<td>Dr. Jandó Gábor</td>
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<tr>
<td>53</td>
<td>Energy balance. Metabolism</td>
<td>Dr. Vértes Zsuzsanna</td>
</tr>
<tr>
<td>54</td>
<td>Principles of nutrition and body mass regulation.</td>
<td>Dr. Vértes Zsuzsanna</td>
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<tr>
<td>55</td>
<td>Body temperature of man. Hyperthermia, fever</td>
<td>Dr. Vértes Zsuzsanna</td>
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<tr>
<td>56</td>
<td>Peripheral control of body temperature</td>
<td>Dr. Vértes Zsuzsanna</td>
</tr>
<tr>
<td>57</td>
<td>Central control mechanisms of body temperature</td>
<td>Dr. Vértes Zsuzsanna</td>
</tr>
</tbody>
</table>
The hypothalamo-hypophyseal system
Dr. Ábrahám István Miklós

Anterior pituitary hormones
Dr. Ábrahám István Miklós

Cellular mechanisms of hormone action I
Dr. Ábrahám István Miklós

Cellular mechanisms of hormone action II
Dr. Ábrahám István Miklós

Hormonal regulation of female sexual functions
Dr. Ábrahám István Miklós

Pregnancy
Dr. Ábrahám István Miklós

Hormonal regulation of male sexual functions. Erection, ejaculation, coitus
Dr. Ábrahám István Miklós

Puberty. Climacteric
Dr. Ábrahám István Miklós

Humoral and central neural control of sexual behaviour
Dr. Ábrahám István Miklós

Functions of posterior lobe of pituitary gland
Dr. Lénárd László I

Thyroid physiology I.
Dr. Környei József László

Thyroid physiology II.
Dr. Környei József László

Integrative regulatory mechanisms
Dr. Lénárd László I

Practices
2. Getting acquainted with the laboratory. General information, schedules. Personal- and equipment safety rules. Animal care regulations
3. Blood I
4. Blood I
5. Blood II
6. Blood II
7. Blood II
8. Blood II
9. Blood III
10. Blood III
11. Blood III
12. Blood III
13. Blood IV
14. Blood IV
15. Blood IV
16. Blood IV
17. Seminar: Blood (Discussion of the topics covered by the lectures and student labs)
18. Seminar: Blood (Discussion of the topics covered by the lectures and student labs)
19. Test on the chapter
20. Test on the chapter
21. The heart and circulation I
22. The heart and circulation I
23. The heart and circulation I
24. The heart and circulation I
25. The heart and circulation II
26. The heart and circulation II
27. The heart and circulation II
28. The heart and circulation II
29 The heart and circulation III
30 The heart and circulation III
31 The heart and circulation III
32 The heart and circulation III
33 The heart and circulation IV
34 The heart and circulation IV
35 The heart and circulation IV
36 The heart and circulation IV
37 Seminar: The heart and circulation
38 Seminar: The heart and circulation
39 Test on the chapter
40 Test on the chapter
41 Respiration
42 Respiration
43 Respiration
44 Respiration
45 Gastrointestinal tract
46 Gastrointestinal tract
47 Gastrointestinal tract
48 Gastrointestinal tract
49 Examination of the urine
50 Examination of the urine
51 Examination of the urine
52 Examination of the urine
53 Measurement of the actual metabolic rate in human
54 Measurement of the actual metabolic rate in human
55 Measurement of the oxygen consumption in the rat
56 Measurement of the oxygen consumption in the rat

Seminars

Exam topics/questions

Topics of questions for the theoretical examination
1. Describe the body fluid compartments and explain the methods used for measurement of body fluid volumes
2. Describe the major plasma proteins and the other non-electrolytic constituents of blood and explain their function in the body
3. Describe the intra- and extracellular ionic components and explain their physiological functions
4. The structure, function and origin of erythrocytes
5. Characterize the various leukocytes indicating their origins and functions
6. Origin and function of blood platelets
7. The basic structure and metabolism of haemoglobin and the metabolism of iron
8. Describe the two pathways involved in the initiation of blood coagulation
9. Specific mechanism of clot formation
10. Describe the mechanism of fibrinolysis. Explain the significance of anticoagulation mechanism
11. Regulation of H+ ion concentration in the blood
12. A-B-0 blood groups. The Rh blood types
13. The role of leukocytes in the defence mechanism
14. Mechanical activity of the heart and the three-component model of heart muscle. Calcium ion movements within the cardiac muscle cell
15. Generators and conductors of impulses in the heart. Refractory periods
16. The sequence of events in the cardiac cycle
17. The human electrocardiogram (ECG). Electrocardiography: bipolar and unipolar leads
18. The heart sounds. Phonocardiography (PCG)
19. Cardiac output: measurement, normal standards and physiological variations
20. Metabolism and energetics of cardiac muscle
21. Ventricular wall tension and the Laplace relationship
22. The heart-lung preparation (Starling’s laws)
23. Arterial blood pressure: determinants of normal arterial blood pressure
24. The arterial and the venous pulse. Basic principles of hemodynamics.
25. Circulation through the capillaries
26. The properties, production and the movement of lymph
27. Circulation in the vein. Effect of gravity on circulation
28. The pulmonary circulation. Control of lung vessels
29. The coronary circulation
30. Cerebral circulation. The concept of „blood-brain barrier”
31. Splanchnic circulation
32. Skeletal muscle circulation. Cutaneous circulation
33. Nervous control of the heart
34. Control mechanisms of the circulatory system: general considerations
35. Local control of the vascular smooth muscle
36. Autoregulation of blood flow in tissues and organs
37. The function and importance of baroreceptors in the regulation of circulation
38. Reflex control mechanisms of circulation
39. Mechanisms of vasoconstriction and vasodilatation
40. Mechanics of respiration (functions of respiratory muscles, compliance, intrathoracic pressures, respiratory volumes)
41. Alveolar air, alveolar ventilation, dead spaces. Function of the respiratory passageways
42. Gaseous exchange in the lungs and tissues
43. O2 and CO2 transport in the body
44. Peripheral and central regulatory mechanisms of respiration. Respiratory reflexes
45. Chemical control of respiration. Acidosis, alkalois
47. Describe the origin, composition, function and control of salivary secretion
48. Describe the origin, nature and function of gastric secretion indicating the mechanisms of regulation
49. Mechanism and regulation of gastrointestinal movements
50. Identify the pancreatic secretions, their components, their action and the substrates on which they act. Control mechanism of pancreatic secretion
51. Describe the basic ingredients and functions of the bile indicating the origin and fate of the components and the factors controlling bile secretions and gall bladder functions
52. Identify the components and functions of the intestinal system
53. Describe how carbohydrate is digested and absorbed indicating the enzymes involved
54. Describe how fat is digested and absorbed indicating the enzymes and secretions involved
55. Describe how protein is digested and absorbed indicating the enzymes and secretions involved
56. Dynamics of glomerular filtration. Glomerular filtration rate. Plasma clearance
57. Renal blood flow. Clearance of PAH. Extraction ratio. Filtration fraction
58. Regulation of renal blood flow and pressure. Renin-angiotensin system
59. Reabsorption and secretion of different substances in the renal tubule. Methods for their investigation
60. Concentrating and diluting mechanisms of the kidney
61. Fluid volume regulation of the body
62. Regulation of concentrations of ions in the extracellular fluid. Regulation of osmolality of body fluids
63. Basal metabolic rate. Describe factors influencing the basal metabolism
64. Define metabolic rate explaining those factors influencing the total expenditure of energy by the body
65. Describe the necessary elements of normal diet
66. The normal body temperature and its physiological variations. Hyperthermia, fever, hypothermia
67. Chemical regulation of body temperature, changes of regulation at low and high environmental temperature
68. Physical regulation of body temperature, changes of regulation at low and high environmental temperature
69. Central regulatory mechanisms of heat production and heat loss
70. Mechanisms of hormone action (receptors, intracellular mediators, cAMP, Ca2+ and diacylglycerol, protein kinases)
71. Mechanism of hormonal regulation. Negative and positive feedback controls in the endocrine system
72. The anterior pituitary hormones. Regulation of pituitary hormone secretions. Pituitary dysfunction
73. Function of growth hormone during development and after adolescence
74. Abnormalities of thyroid secretion. Goitrogens
75. Function of the thyroid gland. Iodine metabolism in the body
76. Hormonal changes during menstrual cycle
77. Hormonal changes during pregnancy. Role of placenta in pregnancy. Foeto-placental unit
78. Hormones of lactation
79. Mechanism of erection and ejaculation. The sexual act (coitus)
80. The function of testis, epididymis, seminal vesicle and prostate
81. Regulation of the sexual behaviour. Maternal behaviour
82. Physiological changes at puberty and climacteric
83. Vasopressin and oxytocin. Function of ANH (atrionatriuretic hormone)
84. The effects of prostaglandins
Questions for the student lab report:
1. Hematocrit
2. Red blood cell counting
3. Mean size of red blood cells
4. Estimation of platelet count
5. White blood cell counting
6. Differential leukocyte count
7. Reticulocyte counting
8. Erythrocyte sedimentation rate
9. Determination of osmotic resistance
10. Determination of hemoglobin concentration
11. Examination of hemoglobin spectra
12. MCV, MCH, MCHC values
13. Bleeding time
14. Clotting time
15. Prothrombin time
16. Blood group determination (AB0 and Rh typing)
17. How to use work stations for electrophysiological registrations
18. Recording of heart beats of the frog or fish “in situ”
19. Electrocardiography (ECG)
20. Electric stimulation of heart (demonstr. of extrasystole)
21. Phonocardiography (PCG)
22. Effect of thermal stimulations
23. Examination of the arterial pulse
24. Ligatures of Stannius
25. Measurement of blood pressure in human
26. Investigation of Bowditch’s „All or nothing” law
27. Investigation of summation
28. Effect of vagal stimulation on the heart
29. Direct measurement of blood pressure in cat
30. Isolated frog’s heart preparing by Straub cannula
31. Exercise physiology, Physical fitness index
32. Effect of ions on the isolated heart
33. Effect of adrenalin on isolated frog’s heart
34. Effect of acetylcholin on isolated frog’s heart
35. Discussion of neurohumoral transmission (Loewi-experiment)
36. Spirometry, dynamic parameters of respiration.
37. Volumes and capacities of the lungs.
38. Circulation in the peripheral blood vessels (Trendelenburg)
39. The circulation through capillaries of frog’s tongue.
40. Measurement of maximal respiratory pressures (The experiments of Müller and Valsalva)
41. Percussion and auscultation
42. Demonstration of basic respiratory movements and pressure/volume changes (Donders model)
43. Measurement of compliance
44. Examination of the saliva
45. Measurement of the actual metabolic rate in human
46. Gastric juice: Determination of BAO, MAO, PAO
47. Measurement of the oxigen consumption in rat.
49. Bile: detection of bile pigments
50. Feces: Detection of blood (Guajac-, benzidin-, Hematest)
51. Specific gravity and pH of urine.
52. Examination of the urine sedimnt
53. Urine examination with reagent strip methodology
54. Examination of the urine components with tests in tubes: protein, glucose, keton bodies, blood, ubg, bilirubin, pus detections
Participants

Dr. Jandó Gábor (JAGMAAP.PTE), Dr. Környei József László (KOJNAAP.PTE), Dr. László Kristóf (LAKFABO.PTE), Dr. Lengyel Ferenc (LEFAAA.TJ.PTE), Dr. Szabó István (SZIGAAO.PTE), Dr. Vértes Zsuzsanna (VEZHAEE.PTE), Köbor Péter (KOPSAAO.PTE), Péczely László Zoltán (PELHAAO.PTE)
OAA-HUG  Basics of Human Genetics

Course director:  Dr. Béla Melegh, professor
Medical Genetics and Child Development

1 credit • semester exam • Basic module • autumn semester • recommended semester: 3

Number of hours/semester: 14 lectures + 0 practices + 0 seminars = total of 14 hours

Course headcount limitations (min.-max.): 5 – 3

Prerequisites: OAA-MB2 completed

Topic
The goal of this course is to delineate the structure and variations of the human genome, to foster the formation of an approach that will aid the acquirement of preclinical and later clinical subjects with the possession of a molecular knowledge. The further goal is to discuss the molecular basics associated with human heredity and to introduce diagnostic methods relevant to the understanding of heritable disorders.

Conditions for acceptance of the semester
The grades will be established by a written test at the end of the semester. The written test can be replaced by two successful midterm tests.

Mid-term exams
The date of the midterms (depending on available rooms) will be advertised on the second week of the semester. There is no possibility to substitute or correct the midterms/grades. In case of unsuccessful midterms the students have the regular possibilities to take the exam in the exam period.

Making up for missed classes

Reading material
- Obligatory literature
- Literature developed by the Department
- Notes
- Recommended literature
The basis is the topics of the lectures.
Further readings:
Tom Strachan and Andrew P. Read: Human Molecular Genetics

Lectures
1 Introduction: history of genetics, the Human Genome Project, the postgenom era, ENCODE project
   Dr. Melegh Béla
2 Construction of pedigree, basics of mendelian inheritance, characteristics of mendelian and non-mendelian inheritance I
   Dr. Hadzsiev Kinga
3 Construction of pedigree, basics of mendelian inheritance, characteristics of mendelian and non-mendelian inheritance II
   Dr. Halmainé Dr. Komlósi Katalin
4 Organization of the human genome I. From the nuclear and mitochondrial genome to organization of the chromosomes
   Dr. Kövesdi Erzsébet
5 Organization of the human genome II: Special elements of the human genome: organization and function of coding and non-coding regions; LINE, SINE, Alu sequence elements, SNP, CNV
   Dr. Melegh Béla
6 Organization of the human genome III: Basics of cytogenetics, FISH, CGH, array techniques
   Dr. Hadzsiev Kinga
7 Examination methods I. Hybridization methods (blot, PCR and modifications, RFLP, Sanger, NGS, MLPA)
   Dr. Berenténé Dr. Bene Judit Ágnes
8 Examination methods II. Biochemical diagnostics, enzyme diagnostics, determination of metabolites
   Dr. Berenténé Dr. Bene Judit Ágnes
9 Examination methods III: Cytogenetic diagnostics
   Dr. Czakó Mártta
10 Basics of pharmacogenetics, concept of personalised medicine
   Dr. Melegh Béla
11 Mutations, SNPs, haplotypes, genetic drift
   Dr. Kövesdi Erzsébet
12 Linkage, genetic mapping, Hardy-Weinberg rule, GWAS
   Dr. Berenténé Dr. Bene Judit Ágnes
13  Epigenetics, imprinting
    Dr. Hadzsiev Kinga
14  Studying gene function, proteomics, bioinformatics
    Dr. Berenténé Dr. Bene Judit Ágnes

Practices

Seminars

Exam topics/questions

CooSpace system.

Participants
OAA-KET  |  PUBLIC HEALTH 3 (ENVIRONMENTAL HEALTH)
Course director: DR. CSABA VARGA, associate professor
Department of Public Health Medicine

1 credit • semester exam • Basic module • autumn semester • recommended semester: 3

Number of hours/semester: 7 lectures + 7 practices + 0 seminars = total of 14 hours
Course headcount limitations (min.-max.): 1 –
Prerequisites: OAA-AED completed + OAA-BI2 completed + OAA-OR2 completed

**Topic**

The aim of the course is the introduction into the environmental related health impacts and with a particular focus on the prevention.

**Conditions for acceptance of the semester**

Absence of 2x45 minutes from practical is acceptable. Above this the semester cannot be accepted.

In the 8th semester students have to do a final exam of Public Health, for it they need completed courses, which are the followings: The basics of Disease Prevention (OAA-BMA), General Epidemiology and Demography (OAA-AED), Environmental Health (OAA-KET), Preventive Medicine (OAPNEO), Detailed Epidemiology (OAKREP), Occupational Hygiene and Occupational Medicine (OAKMFO).

**Mid-term exams**

End-of-term examination (written test)

**Making up for missed classes**

Students may attend the practical of another group on the same week. Pre-consultation with practical leader is needed.

**Reading material**

- Obligatory literature
- Literature developed by the Department
  Educational material uploaded on CooSpace.
- Notes
- Recommended literature

**Lectures**

2. Natural and artificial environment. Health effects of the indoor environment. Environmental monitoring, environmental protection. Dr. Varga Csaba
4. Health impacts of contaminants in water. Sewage and waste waters. Dr. Varga Csaba
5. Health impacts of contaminants in water. Dr. Varga Csaba
6. Chemical safety. Dr. Varga Csaba
7. Physical exposures: Noise and vibration. Dr. Varga Csaba

**Practices**

1. Water chemistry laboratory practice I.
2. Water chemistry laboratory practice II.
3. Water microbiology laboratory practice I.
4. Water microbiology laboratory practice II.
5. Health effects of physical exposures I: Radiations, electromagnetic fields.
6. Radiation hygienic laboratory practice
7. Aerobiology.
Seminars

Exam topics/questions
- Rely on material from lectures and seminars
- Educational material uploaded on CooSpace

Participants
Bérczi Bálint Dániel (BEBIABT.PTE), Dr. Gombos Katalin (GOKFAAO.PTE), Dr. Gyöngyi Zoltán (GYZMAAO.PTE), Dr. Szendi Katalin (SZKFAP.O.PTE)
OAA-SF2  HISTOLOGY AND EMBRYOLOGY 2
Course director: DR. JUDIT HORVÁTH, associate professor
Department of Anatomy

4 credit • semester exam • Basic module • autumn semester • recommended semester: 3

Number of hours/semester: 28 lectures + 28 practices + 0 seminars = total of 56 hours
Course headcount limitations (min.-max.): 5 – 260
Prerequisites: OAA-AA2 parallel + OAA-SF1 completed

Topic
Histology of the organs. Formation of organs and organ-systems and their further development in the embryonal and fetal period. This is the second part of a two-semester subject.
Histology is important to understand normal physiological processes on microscopic level and to explain pathological changes in diseases. Embryology helps to explain the normal anatomical situs and certain malformations, syndromes.

Conditions for acceptance of the semester
In the histology practices, the students must prepare a histology notebook (Histology-2 notebook) with the drawings of every slide studied during the semester. The notebook will be double-checked and signed by the practice leader at the end of the semester. Presence on at least 85% of course hours is required. Absence (for any reason) is max. 8 teaching hours (= 8x45 min.) including max. 5 practice hours.

Mid-term exams
Making up for missed classes
Exceptionally, students may attend the lab of another group on the same week (maximum twice in a semester).

Reading material
- Obligatory literature
  http://an-server.pote.hu/INFO/elrod.htm
- Literature developed by the Department
  http://an-server.pote.hu/
- Notes
- Recommended literature

Lectures
1  Histology of the oral cavity, tongue and salivary glands.
   Dr. Rékási Zoltán
2  Histology and development of the teeth.
   Dr. Tóth Pál
3  Lymphatic tissues and their functions.
   Dr. Gaszner Balázs
4  Histology of lymphatic organs.
   Dr. Gaszner Balázs
5  Histology of the respiratory system.
   Dr. Rékási Zoltán
6  Development of the respiratory system.
   Dr. Rékási Zoltán
7  Development of the face and the oral and nasal cavity. Malformations.
   Dr. Tóth Pál
8  Development and derivatives of the pharyngeal gut.
   Dr. Horváth Judit
9  Histology of the esophagus and the stomach.
   Dr. Pethőné Dr. Lubics Andrea
10 History of the intestines.
    Dr. Pethőné Dr. Lubics Andrea
11 Early development of the heart; Development of sinus venosus and the atrial septum.
   Dr. Tamás Andrea
12 Development of the ventricles.
   Dr. Tamás Andrea
13 Histology of the liver and pancreas.
   Dr. Csermás Valér
14 Development of the intestinal system, liver and pancreas.
   Dr. Tamás Andrea
15 Histology of the kidney.
   Dr. Csernus Valér
16 Histology of ureter and urinary bladder. Development of the kidney.
   Dr. Csernus Valér
17 Histology of the ovary. Follicular development.
   Dr. Kovács Magdolna
18 The uterine tube, uterus, and vagina. Cyclic changes of the endometrium.
   Dr. Kovács Magdolna
19 The pregnant uterus, the placenta and the mammary gland.
   Dr. Kovács Magdolna
20 Development of the arterial and venous system. Aortic arches and their derivatives.
   Dr. Tamás Andrea
21 Fetal circulation.
   Dr. Tóth Pál
22 Histology of the male reproductive system I.
   Dr. Rékási Zoltán
23 Histology of the male reproductive system II.
   Dr. Rékási Zoltán
24 Development of the reproductive organs I.
   Dr. Horváth Judit
25 Development of the reproductive organs II.
   Dr. Horváth Judit
26 Development of the peritoneum. Separation of the body cavities.
   Dr. Horváth Judit
27 Recapitulation of organ histology. Recognition of histological slides.
   Dr. Tóth Pál
28 Parallelly developing organ systems. (Recapitulation of embryology)
   Dr. Horváth Judit

Practices
1  Histology of the lip and the salivary glands.
2  Histology of the lip and the salivary glands.
3  Histology and development of the teeth.
4  Histology and development of the teeth.
5  Histology of the tongue. Tonsils.
6  Histology of the tongue. Tonsils.
7  Histology of the lymphatic organs.
8  Histology of the lymphatic organs.
9  Histology of the respiratory system.
10 Histology of the respiratory system.
11 The esophagus and the stomach.
12 The esophagus and the stomach.
13 Small and large intestine.
14 Small and large intestine.
15 Histology of the rectum, liver, gall bladder and pancreas.
16 Histology of the rectum, liver, gall bladder and pancreas.
17 Histology of the kidney, ureter, and urinary bladder.
18 Histology of the kidney, ureter, and urinary bladder.
19 Histology of the female reproductive organs I. (Ovary, corpus luteum, uterine tube).
20 Histology of the female reproductive organs I. (Ovary, corpus luteum, uterine tube).
21 Histology of the female reproductive organs II. (Uterus prolif./secr., cervix, vagina).
22 Histology of the female reproductive organs II. (Uterus prolif./secr., cervix, vagina).
23 Histology of the pregnant uterus, the placenta, the umbilical cord and the mammary gland.
24 Histology of the pregnant uterus, the placenta, the umbilical cord and the mammary gland.
Histology of the male reproductive organs I.
Histology of the male reproductive organs I.
Histology of the male reproductive organs II.
Histology of the male reproductive organs II.

Seminars

Exam topics/questions

http://an-server.pote.hu/

Participants

Dr. Csernus Valér (CSVGAAO.PTE), Dr. Czeiter Endre (CZEFAAO.PTE), Dr. Dányádi Bese (DABNAAO.PTE), Dr. Farkas Boglárka (FABFADO.PTE), Dr. Farkas József (FAJHAAO.PTE), Dr. Gaszner Balázs (GABFADO.PTE), Dr. Hollósy Tibor (HOTFAAO.PTE), Dr. Horváth Judit (HOJIAAO.PTE), Dr. Horváth-Opper Gabriella (HOGFAFO.PTE), Dr. Kiss Péter (KIPFABO.PTE), Dr. Kovács Magdolna (KOMLAAO.PTE), Dr. Kvárik Tímea (KVTOAA-O.PTE), Dr. Pethőné Dr. Lubics Andrea (PELMAAO.PTE), Dr. Rékási Zoltán (REZMAAO.PTE), Dr. Sétáló György (SEGGAAO.PTE), Dr. Tamás Andrea (TAFAAO.PTE), Dr. Timá Lajos (TILGAAO.PTE), Dr. Tóth Pál (TOPMAAO.PTE), Fábián Eszter (FAEGAAT.PTE), Opper Balázs (OPBFAB.T.JPTE)
OAA-EL2

PHYSIOLOGY 2

Course director: DR. ZOLTÁN KARÁDI, professor
Department of Physiology

9 credit • final exam • Basic module • spring semester • recommended semester: 4

Number of hours/semester:
70 lectures + 56 practices + 0 seminars = total of 126 hours

Course headcount limitations (min.-max.): 5 –

Prerequisites: OAA-NEA parallel + OAA-EL1 completed

Topic
The most important mission of the Physiology Course in medical education is to familiarize students with the attributes of healthy functions of the living organism.

While acquiring knowledge about the most important functional characteristics of the human body the students can rely on their prior studies in biology, biophysics, chemistry-biochemistry and anatomy.

During the semester we introduce the most important elements of functioning of the organs and organ systems, as well as their cooperation also required to adapting to the environment, and the factors affecting these processes.

Special emphasis is placed on the neural and humoral regulatory processes of these life-functions, which are vital to maintain and preserve the homeostasis of the organism.

With the transfer of all this knowledge we would like to mould a holistic attitude and thinking of students, which will enable them to better understand the functions of the now healthy, however, later dysfunctional human organism.

Conditions for acceptance of the semester

Maximum of 15 % absence allowed

Mid-term exams

Writing of the mid-term test on the 11th week Friday at 4 P.M. is not obligatory, thus students must sign up for it. The theoretical and lab practice material of the 1st-10th educational weeks will be covered. With good results here, bonus points can be gained that will be added to the points of the final exam. Students with bonus points are not required to take the oral student lab report on the 14th week to have the semester signed (A chance). To have the semester signed; students must take the oral student lab report on the 14th week according to the time table schedule of the group’s lab practices. These two retake possibilities (B and C chances) will be provided to each group during the first and second halves of the 14th week. The student’s lab notebook and filled-up Worksheets must be presented here. Students with too many lab absences (namely O,A,D 5-6-7, F,S,Z 3-4 and G,P 3-4) have to answer one additional question correctly at the oral student lab report

Making up for missed classes

The missed lab practice is advised to be covered by joining another group while the same topic is on schedule.

Reading material
- Obligatory literature
- Literature developed by the Department
  Figures of the lectures given are available on the homepage of Institute of Physiology and on the CooSpace. Important messages on new information will be announced at the lectures and will be sent to you by course mails.
  Please always find the current updated information and study materials on the homepage of the Institute of Physiology (physiology.aok.pte.hu).
- Notes
  Homepage of PTE ÁOK Institute of Physiology: Physiology Lab Practices 2, internet study material, printable notebook, 2015
  Homepage of PTE ÁOK Institute of Physiology: Physiology Lab Practice Worksheets 2, internet study material, printable notebook, 2015
- Recommended literature
  Fonyó: Principles of Medical Physiology, Medicina Publishing, 2002
  J.B. West (ed.): Best and Taylor’s Physiological Basis of Medical Practice, Williams and Wilkins, 1998

Lectures
1  Hormonal control of calcium homeostasis
   Dr. Környei József László
2  Special problems of neonatal physiology. Physiology of ageing
   Dr. Környei József László
3 Endocrinology of the adrenal cortex I
Dr. Vértés M Marietta

4 Endocrinology of the adrenal cortex II
Dr. Vértés M Marietta

5 Endocrinology of the adrenal cortex III
Dr. Vértés M Marietta

6 The adrenal medulla. Endocrinology of stress
Dr. Ábrahám István Miklós

7 The endocrine pancreas
Dr. Vértés M Marietta

8 Hormonal control of intermediary metabolism I. Diabetes m.
Dr. Vértés M Marietta

9 Hormonal control of intermediary metabolism II
Dr. Környei József László

10 Introduction to the physiology of the nervous system, general concepts
Dr. Jandó Gábor

11 Membrane potential. Action potential and its propagation
Dr. Jandó Gábor

12 Electrophysiology of interneuronal synapses
Dr. Ábrahám István Miklós

13 Neurochemical basis of neurotransmission
Dr. Ábrahám István Miklós

14 Function of the neuromuscular junction
Dr. Ábrahám István Miklós

15 Molecular mechanism of muscle contraction
Dr. Ábrahám István Miklós

16 Mechanical characteristics of muscle. The source of energy for muscle contraction. Heat production
Dr. Ábrahám István Miklós

17 Electromyography. Control of muscle contraction, muscle tone, fatigue
Dr. Ábrahám István Miklós

18 Contraction of smooth muscle
Dr. Ábrahám István Miklós

19 The motor unit. Peripheral neural mechanism of muscle control
Dr. Jandó Gábor

20 Functional importance of mechanoreceptors
Dr. Jandó Gábor

21 Spinal cord functions I
Dr. Jandó Gábor

22 Spinal cord functions II
Dr. Jandó Gábor

23 The spinal shock
Dr. Lénárd László I

24 Decerebrate rigidity
Dr. Lénárd László I

25 Postural coordination
Dr. Lénárd László I

26 Locomotion
Dr. Lénárd László I

27 Extrapyramidal system I
Dr. Lénárd László I

28 Extrapyramidal system II
Dr. Lénárd László I

29 Physiology of the vestibular system
Dr. Lénárd László I

30 Cerebellar control of motor functions I
Dr. Lénárd László I

31 Cerebellar control of motor functions II
Dr. Lénárd László I
<table>
<thead>
<tr>
<th>32</th>
<th>Cortical control of motor functions. The pyramidal system</th>
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<td>Somaesthetic mechanisms</td>
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<td>Somatotopic representations in the sensory systems</td>
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<td>Thalamocortical somatosensory functions. The sensory cortex</td>
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<td>Pain mechanism</td>
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<td>Optics of vision. Refractory errors of the eye</td>
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<td>Retinal mechanisms</td>
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<td>Visual pathways, midbrain mechanism of vision</td>
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<td>40</td>
<td>Central mechanism of vision</td>
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<td>Eye movements and their control</td>
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<td>Physiology of hearing I</td>
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<td>Physiology of hearing II</td>
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<td>Central auditory mechanisms</td>
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<td>The chemical senses I. Olfaction</td>
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<td>46</td>
<td>The chemical senses II. Taste</td>
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<td>47</td>
<td>The autonomic nervous system I</td>
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<td>The autonomic nervous system II</td>
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<td>Electroencephalography I</td>
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<td>50</td>
<td>Electroencephalography II</td>
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<td>51</td>
<td>Neural control mechanism of sleep I</td>
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<td>52</td>
<td>Neural control mechanism of sleep II</td>
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<td>53</td>
<td>Clinical importance of the evoked potential technique</td>
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<td>54</td>
<td>The diencephalon (hypothalamus). Its motor, autonomic and hormonal regulatory functions</td>
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<td>55</td>
<td>The concept of drive and motivation</td>
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<td>56</td>
<td>Homeostatic drives. Central neural regulation of hunger and thirst</td>
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<td>57</td>
<td>Control of biological rhythms</td>
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<td>58</td>
<td>The limbic system I</td>
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<td>59</td>
<td>The limbic system II</td>
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<tr>
<td>60</td>
<td>Monoaminergic systems and their functions</td>
</tr>
</tbody>
</table>
61 Emotions and their central nervous mechanism
Dr. Lénárd László I

62 Mechanism of learning I
Dr. László Kristóf

63 Mechanism of learning II
Dr. László Kristóf

64 Types and disorders of memory functions I
Dr. László Kristóf

65 Types and disorders of memory functions II
Dr. László Kristóf

66 Plasticity of the peripheral and central nervous system
Dr. Varga Csaba

67 Intrinsic cortical mechanism. Functions of the frontal lobe
Dr. Lénárd László I

68 The parieto-temporal lobe
Dr. Lénárd László I

69 Cerebral dominance
Dr. Lénárd László I

70 Neurophysiological mechanisms of speech. Speech disorders
Dr. Lénárd László I

Practices

1 The endocrine pancreas
2 The endocrine pancreas
3 The endocrine pancreas
4 The endocrine pancreas
5 Reproduction
6 Reproduction
7 Reproduction
8 Reproduction
9 Peripheral nervous system I
10 Peripheral nervous system I
11 Peripheral nervous system I
12 Peripheral nervous system I
13 Peripheral nervous system II
14 Peripheral nervous system II
15 Peripheral nervous system II
16 Peripheral nervous system II
17 Seminar: Endocrinology, Peripheral nerve, Membrane potential, Action potential, Synaptic transmission
18 Seminar: Endocrinology, Peripheral nerve, Membrane potential, Action potential, Synaptic transmission
19 Student report (test)
20 Student report (test)
21 Experiments on muscles
22 Experiments on muscles
23 Experiments on muscles
24 Experiments on muscles
25 Electromyography, Examination of fatigue
26 Electromyography, Examination of fatigue
27 Electromyography, Examination of fatigue
28 Electromyography, Examination of fatigue
29 Examination of reflexes
30 Examination of reflexes
31 Examination of reflexes
32 Examination of reflexes
33 Central nervous system
34 Central nervous system
35 Central nervous system
36 Central nervous system
37 Seminar: Muscle and reflexes
38 Seminar: Muscle and reflexes
39 Student report (test)
40 Student report (test)
41 Sensory organs I
42 Sensory organs I
43 Sensory organs I
44 Sensory organs I.
45 Sensory organs II
46 Sensory organs II
47 Sensory organs II
48 Sensory organs II
49 Electroencephalography in humans
50 Electroencephalography in humans
51 Electroencephalography in humans
52 Electroencephalography in humans
53 Student lab
54 Student lab
55 Student lab
56 Student lab

Seminars

Exam topics/questions

Topics of questions for the theoretical examination

1. Describe the body fluid compartments and explain the methods used for measurement of body fluid volumes
2. Describe the major plasma proteins and the other non-electrolytic constituents of blood and explain their function in the body
3. Describe the intra- and extracellular ionic components and explain their physiological functions
4. The structure, function and origin of erythrocytes
5. Characterize the various leukocytes indicating their origins and functions
6. Origin and function of blood platelets
7. The basic structure and metabolism of haemoglobin and the metabolism of iron
8. Describe the two pathways involved in the initiation of blood coagulation
9. Specific mechanism of clot formation
10. Describe the mechanism of fibrinolysis. Explain the significance of anticlotting mechanism
11. Regulation of H+ ion concentration in the blood
12. A-B-0 blood groups. The Rh blood types
13. The role of leukocytes in the defence mechanism
14. Mechanical activity of the heart and the three-component model of heart muscle. Calcium ion movements within the cardiac muscle cell
15. Generators and conductors of impulses in the heart. Refractory periods
16. The sequence of events in the cardiac cycle
17. The human electrocardiogram (ECG). Electrocardiography: bipolar and unipolar leads
18. The heart sounds. Phonocardiography (PCG)
19. Cardiac output: measurement, normal standards and physiological variations
20. Metabolism and energetics of cardiac muscle
21. Ventricular wall tension and the Laplace relationship
22. The heart-lung preparation (Starling’s laws)
23. Arterial blood pressure: determinants of normal arterial blood pressure
24. The arterial and the venous pulse. Basic principles of hemodynamics.
25. Circulation through the capillaries
26. The properties, production and the movement of lymph
27. Circulation in the vein. Effect of gravity on circulation
28. The pulmonary circulation. Control of lung vessels
29. The coronary circulation
30. Cerebral circulation. The concept of „blood-brain barrier”
31. Splanchnic circulation
32. Skeletal muscle circulation. Cutaneous circulation
33. Nervous control of the heart
34. Control mechanisms of the circulatory system: general considerations
35. Local control of the vascular smooth muscle
36. Autoregulation of blood flow in tissues and organs
37. The function and importance of baroreceptors in the regulation of circulation
38. Reflex control mechanisms of circulation
39. Mechanisms of vasoconstriction and vasodilation
40. Mechanics of respiration (functions of respiratory muscles, compliance, intrathoracic pressures, respiratory volumes)
41. Alveolar air, alveolar ventilation, dead spaces. Function of the respiratory passageways
42. Gaseous exchange in the lungs and tissues
43. O2 and CO2 transport in the body
44. Peripheral and central regulatory mechanisms of respiration. Respiratory reflexes
45. Chemical control of respiration. Acidosis, alkalosis
47. Describe the origin, composition, function and control of salivary secretion
48. Describe the origin, nature and function of gastric secretion indicating the mechanisms of regulation
49. Mechanism and regulation of gastrointestinal movements
50. Identify the pancreatic secretions, their components, their action and the substrates on which they act. Control mechanism of pancreatic secretion
51. Describe the basic ingredients and functions of the bile indicating the origin and fate of the components and the factors controlling bile secretions and gall bladder functions
52. Identify the components and functions of the intestinal system
53. Describe how carbohydrate is digested and absorbed indicating the enzymes involved
54. Describe how fat is digested and absorbed indicating the enzymes and secretions involved
55. Describe how protein is digested and absorbed indicating the enzymes and secretions involved
56. Dynamics of glomerular filtration. Glomerular filtration rate. Plasma clearance
57. Renal blood flow. Clearance of PAH. Extraction ratio. Filtration fraction
58. Regulation of renal blood flow and pressure. Renin-angiotensin system
59. Reabsorption and secretion of different substances in the renal tubule. Methods for their investigation
60. Concentrating and diluting mechanisms of the kidney
61. Fluid volume regulation of the body
62. Regulation of concentrations of ions in the extracellular fluid. Regulation of osmolality of body fluids
63. Basal metabolic rate. Describe factors influencing the basal metabolism
64. Describe the necessary elements of normal diet
65. The normal body temperature and its physiological variations. Hyperthermia, fever, hypothermia
66. Chemical regulation of body temperature, changes of regulation at low and high environmental temperature
67. Physical regulation of body temperature, changes of regulation at low and high environmental temperature
68. Central regulatory mechanisms of heat production and heat loss
69. Mechanisms of hormone action (receptors, intracellular mediators, cAMP, Ca2+ and diacylglycerol, protein kinases)
70. Mechanism of hormonal regulation. Negative and positive feedback controls in the endocrine system
71. The anterior pituitary hormones. Regulation of pituitary hormone secretions. Pituitary dysfunction
72. Function of growth hormone during development and after adolescence
73. Abnormalities of thyroid secretion. Goitrogens
74. Function of the thyroid gland. Iodine metabolism in the body
75. Hormonal changes during menstrual cycle
76. Hormonal changes during pregnancy. Role of placenta in pregnancy. Foeto-placental unit
77. Hormones of lactation
78. Mechanism of erection and ejaculation. The sexual act (coitus)
79. The function of testis, epididymis, seminal vesicle and prostate
80. Regulation of the sexual behaviour. Maternal behaviour
81. Physiological changes at puberty and climacteric
82. Vasopressin and oxytocin. Function of ANH (atrionatriuretic hormone)
83. The effects of prostaglandins
84. The endocrine pancreas
85. Function of insulin in the body. Diabetes mellitus
86. Hormonal control of carbohydrate metabolism
87. Hormonal control of calcium and phosphor homeostasis
88. Hormonal function of the adrenocortical system. Hypophyseal regulation of the adrenocortical system. Stress and the adaptation syndrome
90. Function and regulation of mineralocorticoids
91. Function and regulation of glucocorticoids
92. Consequences of hypo- and hyperfunction of the adrenal cortex. Androgens and oestrogens of the adrenal cortex.
93. Hormones of the adrenal medulla. Importance of the sympathoadrenal system
94. Physiology of ontogenesis and ageing.
95. Molecular mechanism of muscle contraction. The regulatory role of calcium ion
96. Mechanical characteristics of muscle. Differentiation of fast and slow twitch muscle fibres. Role of the connective tissue in the function of muscles
97. Mechanism of fatigue
98. Electromyography (EMG)
99. The source of energy for muscle contraction (aerobe and anaerobe processes). Heat production during contraction-relaxation cycle
100. The neuromuscular junction
101. Structural and functional differences between skeletal and smooth muscles. Mechanism of smooth muscle contraction
102. Membrane potential and action potential: explain their ionic mechanisms. Membrane properties of CNS neurons
103. The compound action potential. Conductive properties of various nerve fibres
104. Neurochemistry of synapses, neurotransmitters, postsynaptic receptors and neuromodulators. EPSP, IPSP
105. The myotatic (stretch) reflex. Gamma motoneurons
106. The motor units. Central control of muscle contractions
107. Types of mechanoreceptors and their role in motor control
108. How do cutaneous mechanoreceptors help to explore, learn and know our environment?
109. Somatosensory mechanisms of spinal cord and brain stem
110. Pain mechanisms, central and peripheral components
111. Descendent control (gating) of nociception and of pain reactions
112. Organisation of primary somatosensory cortex, thalamocortical projection and somatotopy
113. The human electroencephalogram (EEG). Evoked potential (EP) technique
114. Neural mechanisms of sleep and correlated somatic, autonomic and bioelectrical phenomena. The role of reticular formation in the sleep-wakefulness cycle
115. The diencephalon (hypothalamus), its motor, autonomic and hormonal regulatory function
116. Hunger and thirst. Central regulatory processes of food and water intake
117. Central mechanisms of locomotion
118. Decerebration rigidity and spinal shock (symptoms and mechanisms)
119. Postural and righting reflexes, their central mechanisms and localisation within the spinal cord, brain stem and neocortex
120. Structure and function of the extrapyramidal system
121. Symptoms after damages of different extrapyramidal structures. Role of neurotransmitters in the extrapyramidal functions
122. Importance of the cerebellum in co-ordination of movements
123. Cerebellar cortical mechanisms
124. Structure and function of the vestibular system
125. Functions of the autonomic nervous system. Autonomic reflexes
126. Humoral mediators in the autonomic nervous system. Adrenergic, cholinergic and opioid receptors
127. Structures, connections and functions of the limbic system
128. Functions of the motor cortex. Symptoms following its damage
129. Corticospinal (pyramidal) system. Consequences of lesions of the pyramidal pathways and the peripheral motoneuron
130. The concept of drive and motivation. Their integrated neural mechanisms. Reticular activating system
131. Emotions and their central nervous mechanisms
132. The phenomena of operant (instrumental) and classical (Pavlovian) conditioning. Mechanism of reinforcement
133. Electrical and chemical self-stimulation. Rewarding (positive) and punishing (negative) reinforcement. Simple learning processes. Exceptional forms of conditioning
134. Types and disorders of memory functions
135. Cerebral dominance. Lateralisation of functions in the hemispheres. Split-brain examinations
136. Functions of the parietal and temporal association (intrinsic) areas of the neocortex. Symptoms after damages (apraxia, agnosia)
137. Neurophysiological mechanisms of speech. Speech disorders
138. Functions of the frontal lobe (prefrontal intrinsic area)
139. Functions of the temporal lobe (Kluver-Bucy syndrome)
140. Central monoaminergic systems and their functional significance
141. Peripheral auditory mechanisms (conductive apparatus and cochlea)
142. Central auditory pathways, acoustic cortex and related mechanisms
143. Physiological optics
144. The retina. Photoreceptors and neuronal functions in the retina
145. Central visual pathways, the visual cortex and their functions
146. Colour vision. Stereoscopic vision
147. Peripheral and central mechanisms of olfaction
148. Peripheral and central mechanisms of sensation of taste
149. Plasticity in the nervous system. Consequences of sensory deprivation in the visual cortex. Ageing. Transplantation

Questions for the student lab report:
1. Examination of estrus cycle in rat
2. Different tests of pregnancy
3. Determination of human blood glucose level, and experimental manipulation of blood glucose level in the rabbit
4. Effects of chemical stimuli on striated muscle (Sartorius preparation)
5. Direct and indirect stimulation of nerve-muscle preparation; Effect of curare
6. Recording of a twitch contraction; Superposition, Effects of repetitive stimulation of muscles (complete and incomplete tetanus)
7. Effect of load on muscular contraction
8. Examination of fatigue in nerve-muscle preparation and on humans
9. Electromyographic registration methods (surface and deep electrodes)
10. Examination of smooth muscle functions
11. Measurement of conduction velocity of peripheral nerve trunks
12. Recording of a compound action potential of peripheral nerve trunks
13. Measurements of refractory period of peripheral nerve trunks
14. Demonstration of electrotonus and polarizing currents on a nerve-muscle preparation
15. Demonstration of the Pflüger’s law on a nerve-muscle preparation
16. Measurement of rheobase and chronaxy on humans and on peripheral nerve trunks of the frog
17. Effect of narcosis on peripheral nerves
18. Examination of reflexes in frog (intact and spinal animal)
19. The law of Bell and Magendie
20. Examination of reflexes in the human
21. Stereotaxic technique
22. Reflex time, reaction time and action time
23. Electroencephalogram (EEG)
24. Measurement of visual acuity
25. Refractive errors and their corrections
26. Examination of visual accommodation
27. Measurement of astigmatia
28. Examination of pupil reactions
29. Ophthalmoscopy
30. Perimetry
31. Examination of color weakness and color blindness
32. Tests of binocular vision
33. Examination of afterimages, color-mixing and contrast effects
34. Laryngoscopy and otoscopy
35. Audiometry
36. Tests on air- and bone conduction;
37. Examination of the taste and olfactory senses
38. Examination of balance

Participants
Dr. Jandó Gábor (JAGMAAP.PTE), Dr. Környei József László (KOJNAAP.PTE), Dr. László Kristóf (LAKFABO.PTE), Dr. Lengyel Ferenc (LEFAAA.T.JPTE), Dr. Szabó István (SZIGAAO.PTE), Dr. Vértes Zsuzsanna (VEZHAAE.PTE), Kőbor Péter (KOPSAAO.PTE), Péczely László Zoltán (PELHAAO.PTE)
OAA-IMM  BASIC IMMUNOLOGY

Course director:  DR. PÉTER NÉMETH, professor
Department of Immunology and Biotechnology

4 credit • semester exam • Basic module • spring semester • recommended semester: 4

Number of hours/semester: 28 lectures + 28 practices + 0 seminars = total of 56 hours
Course headcount limitations (min.-max.): 5 – 200
Prerequisites: OAA-EL2 parallel + OAA-MB2 completed + OAA-SF2 completed

Topic

Conditions for acceptance of the semester
Prepared attendance on lectures and practices. No more absence as 3 in practices.

Mid-term exams
Making up for missed classes
Practice performed with another group on the same week.

Reading material
- Obligatory literature
- Literature developed by the Department
  See on website www.immbio.hu
- Notes
- Recommended literature
  Abul K. Abbas: Cellular and Molecular Immunology
  Janis Kuby: Immunology
  Jan Klein: Immunology

Lectures
0 Role of co-receptors and adhesion molecules
Dr. Németh Péter
0 Cytokines and their role in immune regulation
Dr. Berki Timea
0 Complement system
Dr. Berki Timea
0 Innate immunity: inflammation, leukocyte migration
Dr. Engelmann Péter András
0 T-cell development in the thymus. Stages of maturation and the role of environmental factors
Dr. Berki Timea
0 Cell mediated immunity (CMI) II
Dr. Berki Timea
0 Primary lymphocyte maturation. Expression of antigen receptor genes
Dr. Balogh Péter
0 Regulation of the effector functions: Immunoglobulin mediated immune reactions. Fc receptors.
Dr. Berki Timea
0 Recognition of antigen by T cells . Antigen presentation and MHC restriction
Dr. Németh Péter
0 MHC and their classes, structure and functions
Dr. Németh Péter
0 Molecular components of the immunological recognition: Antibodies and B cell receptors
Dr. Németh Péter
0 Composition of the immune system: developmental properties of its organs, tissues and cells
Dr. Németh Péter
Dr. Berki Timea

The role of adhesion molecules and cytokines in the Th1-Th2 differentiation and isotype expression.
Dr. Berki Timea

Primary B cell development: maturation stages and environmental regulators
Dr. Balogh Péter

Immunity against tumors
Dr. Németh Péter

Cell mediated immunity (CMI): Cytotoxicity (NK cells, cytotoxic T cells) TH cell mediated macrophage activation (delayed type hypersensitivity = DTH.)
Dr. Berki Timea

The central phase of the immune response: cellular interactions, T-B cell cooperation, antibody production. Signal transduction following Ag-recognition
Dr. Boldizsár Ferenc

Introduction, historical overview, main aspects and perspectives in the theoretical and practical immunology - immunobiology
Dr. Németh Péter

The central phase of the immune response: cellular interactions, T-B cell cooperation, antibody production.
Dr. Balogh Péter

Immunological aspects of organ transplantation
Dr. Németh Péter

Cellular and molecular mechanism of allergies. T cell mediated macrophage activation, delayed type hypersensitivity (DTH)
Dr. Németh Péter

Hypersensitivity reactions
Dr. Németh Péter

Miss-regulation of immune system: development of organ-specific and systemic autoimmune diseases
Dr. Németh Péter

Immunological tolerance: Cellular and molecular mechanisms of the immunological tolerance
Dr. Németh Péter

Systemic and local immunity: Mucosa and skin associated immune system
Dr. Németh Péter

Suppression of immune response. Role of the antigen, antigen presenting cells, T and B lymphocytes. Immunoglobulin-immunoglobulin interactions, idiotype network.
Dr. Balogh Péter

Acquired and hereditied immunodeficiencies
Dr. Najbauer József

Practices

Main aspects of immunocytochemistry. Intracellular immunoglobulin detection by immunoperoxidase technique

Short-term and long-term cell cultures. In vitro functional tests of phagocytes, cytotoxic cells

Development and composition of the lymphoid system. Microscopic structure of the lymphoid tissues.

Immunoserology II. Immunoprecipitation, immunodiffusion techniques (Manchini, Ouchterlony), immunoelectrophoresis. Haemagglutination techniques, Coombs test.

Immunoserology I. ELISA, dot-blot, Western blot.

Immunisation techniques. Antibody (polyclonal and monoclonal) production, purification, labelling. Hybridoma technology, fermentation.

Immunisation techniques. Antibody (polyclonal and monoclonal) production, purification, labelling. Hybridoma technology, fermentation.

Consultation

Preparation of white blood cells from the peripheral whole blood. ?Ficoll gradient? centrifugation.

Consultation

Immunoserology II. Immunoprecipitation, immunodiffusion techniques (Manchini, Ouchterlony), immunoelectrophoresis. Haemagglutination techniques, Coombs test.

Development and composition of the lymphoid system. Microscopic structure of the lymphoid tissues.

Main cellular and molecular components of the immune system (seminar)

Main aspects of immunocytochemistry. Intracellular immunoglobulin detection by immunoperoxidase technique

Possible targets in immunotherapies. Monoclonal antibody therapy. (Slides)

Autoantibody detection, tissue typing, determination of the HLA.

Consultation

Possible targets in immunotherapies. Monoclonal antibody therapy. (Slides)
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<th>Types of vaccines and modes of their action. (Slides)</th>
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<tr>
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<td>Immunoserology I. ELISA, dot-blot, Western blot.</td>
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<td>Immune response against pathogens (seminar)</td>
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<td>Consultation</td>
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<td>Flow cytometry. Determination of different CD markers on human peripheral blood cells</td>
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**Seminars**

**Exam topics/questions**

See on web site [www.immbio.hu](http://www.immbio.hu)

**Participants**

Dr. Balogh Péter (BAPOAGP.PTE), Dr. Berki Timea (BETMABO.PTE), Dr. Boldizsár Ferenc (BOFFAAO.PTE), Dr. Engelmann Péter András (ENPAAA.T.JPTE), Dr. Kellermayer Zoltán (KEZMACO.PTE), Dr. Najbauer József (NAJVAAP.PTE), Dr. Németh Péter (NEPGAAO.PTE), Dr. Simon Diána (SIDFABO.PTE)
OAA-NEA Anatomy, Histology, Embryology and Neuroanatomy

Course director: Dr. Zoltán Rékási, associate professor
Department of Anatomy

9 credit • final exam • Basic module • spring semester • recommended semester: 4

Number of hours/semester: 42 lectures + 84 practices + 0 seminars = total of 126 hours
Course headcount limitations (min.-max.): 5 – 200
Prerequisites: OAA-AA2 completed + OAA-SF2 completed + OAA-AA1 completed

Topic
Macroscopic and microscopic anatomy, and development of the central nervous system. Morphological basis of neuroendocrine integration. Regional anatomy of the head and the neck.
Macroscopic, microscopic and ultrastructural composition of the central nervous system including functional and developmental aspects.
Regions of the head and neck with particular reference to those structures innervated by the cranial nerves. Macroscopic and microscopic anatomy of the endocrine organs, as well as sensory organs, and the development of these systems. The course is to give basic morphological knowledge to further clinical studies, including neurology, neurosurgery, ophthalmology, craniofacial surgery, etc.

Conditions for acceptance of the semester
In the histology practices, the students must prepare a histology notebook with the drawings of every slide studied during the semester. The notebook will be double-checked and signed by the practice leader at the end of the semester. Presence on at least 85% of course hours is required. Absence (for any reason) is max. 18 teaching hours (= 18x45 min.) including max. 13 practice hours.

Mid-term exams
Making up for missed classes
Individual study on the consecutive practices of the group (max. three times).

Reading material
- Obligatory literature
  http://an-server.pote.hu
- Literature developed by the Department
  http://an-server.pote.hu
- Notes
  http://an-server.pote.hu
- Recommended literature
  http://an-server.pote.hu

Lectures
1 Histology of the skin.
   Dr. Rékási Zoltán
2 Development of the nervous system, molecular-genetical background.
   Dr. Gaszner Balázs
3 Circulation of the cerebrospinal fluid, blood supply of the brain, meninges: clinical implications.
   Dr. Tóth Pál
4 Methods for studying the nervous system.
   Dr. Gaszner Balázs
5 Basic neurohistology. The neuron 1.
   Dr. Gaszner Balázs
6 Basic neurohistology. The neuron 2.
   Dr. Gaszner Balázs
   Dr. Tóth Pál
8 Basic neurohistology. Axon terminals 2. Receptors.
   Dr. Tóth Pál
9 Basic neurohistology. The glia.
   Dr. Tóth Pál
10 Blood supply and meninges of the spinal cord, clinal aspects.
   Dr. Tóth Pál
11 Microscopic organization of the spinal cord.
   Dr. Tóth Pál
12 Spinal reflexes.
   Dr. Tóth Pál
13 Ascending pathways of the spinal cord.
   Dr. Reglődi Dóra
14 Descending pathways of the spinal cord.
   Dr. Reglődi Dóra
15 The structural organization of the rhombencephalon and the mesencephalon.
   Dr. Rékási Zoltán
16 Nuclei of the cranial nerves.
   Dr. Rékási Zoltán
17 The reticular formation.
   Dr. Reglődi Dóra
18 Anatomical bases of brainstem reflexes.
   Dr. Reglődi Dóra
19 The general structure of the cerebellar cortex.
   Dr. Rékási Zoltán
20 Connections and functions of the cerebellum.
   Dr. Rékási Zoltán
21 The diencephalon. The thalamus.
   Dr. Rékási Zoltán
22 Basal ganglia.
   Dr. Reglődi Dóra
23 Cerebral cortex.
   Dr. Rékási Zoltán
24 Structure and connections of the hippocampus.
   Dr. Gaszner Balázs
25 The hypothalamus and the hypothalamo-hypophyseal system.
   Dr. Kovács Magdolna
26 Endocrine organs 1.
   Dr. Kovács Magdolna
27 Endocrine organs 2.
   Dr. Kovács Magdolna
28 The eye.
   Dr. Tóth Pál
29 The eye and its development.
   Dr. Tóth Pál
30 The external muscles of the eye, movements of the eye and their central mechanisms.
   Dr. Tóth Pál
31 The retina.
   Dr. Lázár Gyula
32 Visual pathway.
   Dr. Lázár Gyula
33 The tympanic cavity, its contents and their development.
   Dr. Tamás Andrea
34 The bony and membranous labyrinth and their development.
   Dr. Tamás Andrea
35 The auditory pathways.
   Dr. Tóth Pál
36 The vestibular system.
   Dr. Tóth Pál
37 Neural basis for the movement-coordination.
   Dr. Csernus Valér
38 The somatosensory systems.
   Dr. Csernus Valér
### Practices

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<tbody>
<tr>
<td>1</td>
<td>Dissecting room: The skull</td>
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<td>Dissecting room: Dissection of the brain</td>
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<td>5</td>
<td>Histology: The skull</td>
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<td>7</td>
<td>Dissecting room: Dissection of the brain</td>
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<td>11</td>
<td>Histology: The integument</td>
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<td>17</td>
<td>Histology: Neurons, peripheral nerves</td>
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<tr>
<td>23</td>
<td>Histology: Nerve terminals, glia</td>
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<tr>
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<tr>
<td>29</td>
<td>Histology: Histology of the spinal cord</td>
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<tr>
<td>31</td>
<td>Dissecting room: Regions of the head and neck</td>
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<td>35</td>
<td>Histology: The spinal cord and the brainstem (seminar)</td>
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<td>41</td>
<td>Histology: The cortex of the cerebellum</td>
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<td>43</td>
<td>Dissecting room: Regions of the head and neck</td>
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<td>45</td>
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<td>47</td>
<td>Histology: Cerebellum and diencephalon (seminar)</td>
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<td>Dissecting room: Regions of the head and neck</td>
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<td>51</td>
<td>Dissecting room: Regions of the head and neck</td>
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<td>53</td>
<td>Histology: Cerebral cortex</td>
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<td>Dissecting room: Dissection of the brain in situ</td>
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<td>57</td>
<td>Dissecting room: Dissection of the brain in situ</td>
</tr>
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<td>59</td>
<td>Histology: Endocrine organs 1</td>
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<td>Dissecting room: Dissection of the brain in situ</td>
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<tr>
<td>63</td>
<td>Dissecting room: The orbita</td>
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<td>Histology: Endocrine organs 2</td>
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<td>Dissecting room: The orbita</td>
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<td>69</td>
<td>Dissecting room: The inner ear</td>
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<td>71</td>
<td>Histology: The eye</td>
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<td>75</td>
<td>Dissecting room: X-ray, MR/CT pictures of the brain and brain vessels</td>
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<td>Histology: The inner ear</td>
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<td>79</td>
<td>Dissecting room: Recapitulation, preparation for the exam</td>
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<tr>
<td>81</td>
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<tr>
<td>83</td>
<td>Histology: Recapitulation, preparation for the exam</td>
</tr>
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### Seminars

Exam topics/questions

http://an-server.pote.hu
Participants
Dr. Csernus Valér (CSVGAO.PTE), Dr. Gaszner Balázs (GABFAO.PTE), Dr. Hollósy Tibor (HOTFAO.PTE), Dr. Kovács Magdolna (KOMLAAO.PTE), Dr. Reglődi Dóra (REDMAO.PTE), Dr. Rékási Zoltán (REZMAO.PTE), Dr. Sétáló György (SEGGAAO.PTE), Dr. Tamás Andrea (TAAFAO.PTE), Dr. Tóth Pál (TOPMAO.PTE)
Topic

The final exam in „Medical Biochemistry” covers the material of subjects of four semesters (Medical Chemistry, Introduction to Biochemistry, Biochemistry, Medical Biochemistry). The material of the four semesters present the metabolic processes and the molecular events of biological information transmission with special respect to the properties and functions of the participating biomolecules. Thus, students are supposed to gain a molecular level insight into the processes by which living organisms sustain their life functions or react to various stimuli, physiological or pathological conditions.

Within these four semesters the subject „Medical Biochemistry”, based on previously acquired knowledge, presents the molecular level alterations appearing under various physiological and pathological circumstances with special respect to organ and organelle specific issues. Moreover, the biochemical background of related disorders and diseases will be also mentioned.

The material of the final exam is direct prerequisite of higher year subjects Pharmacology, Pathophysiology, Microbiology and Clinical Biochemistry. In addition, the material covers the introduction to certain chapters of Internal Medicine and Paediatrics also.

Conditions for acceptance of the semester

Requirements of the acceptance of „Medical Biochemistry” course are the following:

- No more than three absences from the laboratory practices
- Submission of at least 10 out of 12 short tests held at the first 10 minutes of the practices
- Achieving satisfactory level in at least seven of the 12 short tests

Mid-term exams

Making up for missed classes

Permission should be asked from the course director to do the practice with an other group. Permission will be given maximum 2 times.

Reading material

- Obligatory literature
  

- Literature developed by the Department
  
  See CooSpace

- Notes

- Recommended literature
  
  

Lectures

1. Introduction
   Dr. Berente Zoltán

2. Cell signalling and kinases I
   Dr. Veres Balázs

3. Cell signalling and kinases II
   Dr. Veres Balázs

4. Cell signalling, CO and NO as signals, transcription factors
   Dr. Veres Balázs

5. Biochemistry of the septic shock and inflammation
   Dr. Veres Balázs

6. Oxidative stress induced signalling pathways
   Dr. Sümegi Balázs

7. Mechanisms of cell death
   Dr. Sümegi Balázs

8. The cell cycle and its regulation
   Dr. Debreceni Balázs
<table>
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<tr>
<th>Course Description</th>
<th>Instructor</th>
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<tbody>
<tr>
<td>Oncogenes and oncogenesis</td>
<td>Dr. Debreceni Balázs</td>
</tr>
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<td>Tumor suppressors and cancer</td>
<td>Dr. Debreceni Balázs</td>
</tr>
<tr>
<td>Structure of the extracellular matrix</td>
<td>Dr. Tapodi Antal</td>
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<tr>
<td>Matrix metalloproteinases</td>
<td>Dr. Gallyas Ferenc</td>
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<td>Nutrition 1: Macro- and micronutrients, caloric balance</td>
<td>Dr. Berente Zoltán</td>
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<tr>
<td>Nutrition 2: digestion fluids and digestion enzymes</td>
<td>Dr. Berente Zoltán</td>
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<tr>
<td>Molecular mechanisms of water and electrolyte household</td>
<td>Dr. Berente Zoltán</td>
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<tr>
<td>Biochemical background of the pH regulation</td>
<td>Dr. Berente Zoltán</td>
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<tr>
<td>Trace elements, deficiencies</td>
<td>Dr. Berente Zoltán</td>
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<tr>
<td>Water soluble vitamins</td>
<td>Marquettené Dr. Bock Ildikó</td>
</tr>
<tr>
<td>Lipid soluble vitamins</td>
<td>Marquettené Dr. Bock Ildikó</td>
</tr>
<tr>
<td>Molecular events following alcohol ingestion</td>
<td>Dr. Kovács Krisztina</td>
</tr>
<tr>
<td>Iron metabolism</td>
<td>Dr. Kovács Krisztina</td>
</tr>
<tr>
<td>Structural variants of hemoglobin</td>
<td>Dr. Kovács Krisztina</td>
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<tr>
<td>Proteins in blood, blood clotting</td>
<td>Dr. Kovács Krisztina</td>
</tr>
<tr>
<td>Molecular mechanisms of joint and synovial function</td>
<td>Dr. Kovács Krisztina</td>
</tr>
<tr>
<td>Biochemistry of blood vessels</td>
<td>Dr. Kovács Krisztina</td>
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<tr>
<td>Molecular mechanisms of blood pressure regulation</td>
<td>Dr. Sümegi Balázs</td>
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<tr>
<td>Molecular mechanisms of cardiac function</td>
<td>Dr. Sümegi Balázs</td>
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<tr>
<td>Biochemical background of diabetes</td>
<td>Dr. Sümegi Balázs</td>
</tr>
<tr>
<td>Molecular mechanisms of glucose uptake</td>
<td>Dr. Sümegi Balázs</td>
</tr>
<tr>
<td>Biochemistry of the senses</td>
<td>Dr. Tapodi Antal</td>
</tr>
<tr>
<td>Nervous system I</td>
<td>Dr. Tapodi Antal</td>
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<tr>
<td>Nervous system II</td>
<td>Dr. Gallyas Ferenc</td>
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<td>Nervous system III</td>
<td>Dr. Gallyas Ferenc</td>
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<tr>
<td>Biochemical features of the plasma membrane</td>
<td>Dr. Berente Zoltán</td>
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<tr>
<td>Biochemistry of the cytoskeletal function</td>
<td>Dr. Gallyas Ferenc</td>
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<td>Molecular features of ER and Golgi</td>
<td>Dr. Gallyas Ferenc</td>
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<td>Biochemical functions of lysosomes and peroxisomes</td>
<td>Dr. Tapodi Antal</td>
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</table>
38 Molecular mechanisms of the mitochondrial function  
  Dr. Sümegi Balázs
39 Biochemistry of senescence  
  Dr. Gallyas Ferenc
40 Cellular regeneration  
  Marquettené Dr. Bock Ildikó
41 Progenitor cells  
  Marquettené Dr. Bock Ildikó
42 Therapeutics of the future  
  Marquettené Dr. Bock Ildikó

Practices
1 Distribution of enzymes among tissues
2 Distribution of enzymes among tissues
3 Molecular biological methods
4 Molecular biological methods
5 Analysis of body fluids
6 Analysis of body fluids
7 Hormonal Regulation of Metabolism
8 Hormonal Regulation of Metabolism
9 Determination of blood glucose
10 Determination of blood glucose
11 Apoptosis and Necrosis
12 Apoptosis and Necrosis
13 Determination of blood cholesterol
14 Determination of blood cholesterol
15 Stress Responses in Metabolism
16 Stress Responses in Metabolism
17 Determination of uric acid and bilirubin from blood
18 Determination of uric acid and bilirubin from blood
19 Acquired disorders of metabolism
20 Acquired disorders of metabolism
21 Student presentations
22 Student presentations
23 Student presentations
24 Student presentations
25 Study of cholinesterase
26 Study of cholinesterase
27 Consultation
28 Consultation

Seminars

Exam topics/questions

Exam topics will be uploaded to CooSpace. Further exam points can be achieved by oral presentations during the semester.

Participants
Dr. Berente Zoltán (BEZLAAP.PTE), Dr. Debreceni Balázs (DEBFAAO.PTE), Dr. Farkas Viktória (FAVSAAP.PTE), Dr. Jakus Péter (JAPAAA.T.JPTE), Dr. Lengyel Anna (LEAFABO.PTE), Dr. Takátsy Anikó (TAAAAA.T.JPTE), Dr. Tapodi Antal (TAAAAB.T.JPTE), Dr. Veres Balázs (VEBAAB.T.JPTE), Hocsák Enikó (HOEFAB.T.JPTE), Marquettené Dr. Bock Ildikó (MABUAAP.PTE), Nagyné Dr. Kiss Gyöngyi (KIGFAFO.PTE)
OAA-SZO  Behavioral Science 3 (Medical Sociology)

Course director: DR. ZSUZSANNA FÜZESI, professor
Department of Behavioural Sciences

2 credit • semester exam • Basic module • spring semester • recommended semester: 4

Number of hours/semester: 28 lectures + 0 practices + 0 seminars = total of 28 hours
Course headcount limitations (min.-max.): 1 – 150
Prerequisites: OAA-ANT completed + OAA-OET completed

Topic
Medical sociology deals with the sociological and behavioral factors influencing the health status and health care. Acquiring the theoretical and practical basis of sociology at this course, students will be able to realize and understand the basic patterns of behavior in maintenance of health, in the development of illness, and in the process of treatment and care in the context of the society. Main research issues of sociology: epidemiology of chronic diseases; health and illness behavior; sociological-economical aspects of health care; models of development in health care; alternative medicine.

Conditions for acceptance of the semester
According to the Code of Studies and Examinations.

Mid-term exams
Making up for missed classes

Reading material
- Obligatory literature
- Literature developed by the Department
- Notes
- Recommended literature

Lectures
1 Introduction. Sociological approaches to health and medicine
   Dr. Füzesi Zsuzsanna
2 Introduction. Sociological approaches to health and medicine
   Dr. Füzesi Zsuzsanna
3 Measuring health and illness
   Dr. Varga József
4 Measuring health and illness
   Dr. Varga József
5 Social causes of illness
   Dr. Varga József
6 Social causes of illness
   Dr. Varga József
7 Labelling behaviour
   Dr. Varga József
8 Labelling behaviour
   Dr. Varga József
9 Models of illness
   Dr. Füzesi Zsuzsanna
10 Models of illness
   Dr. Füzesi Zsuzsanna
11 Illness behaviour
   Dr. Varga József
12 Illness behaviour
   Dr. Varga József
13 Coping with illness
   Dr. Varga József
14 Coping with illness
   Dr. Varga József
Doctor-patient relationship
Dr. Füzesi Zsuzsanna

Medical profession, professional socialization
Dr. Varga József

Clinical autonomy
Dr. Varga József

Inequalities in health, types of health care
Dr. Füzesi Zsuzsanna

Delivering and evaluating health care
Dr. Füzesi Zsuzsanna

Social basis of disease
Dr. Füzesi Zsuzsanna

Social role of medicine
Dr. Füzesi Zsuzsanna

Practices

Seminars

Exam topics/questions

Semester exam:
Written multiple choice test, about 50-60 questions. Improvement of exam mark: oral exam.
Knowledge basis of exam:
Questions of oral exam: titles and subtitles of the lectures and the reference book.
Further details about the exam can be found at the homepage of the Institute of Behavioural Sciences: www.aok.pte.hu/magtud

Participants
OAR-HUF-O  FINAL EXAMINATION IN MEDICAL HUNGARIAN - ORAL

Course director: DR. GÁBOR RÉBÉK-NAGY, associate professor
Department of Languages for Specific Purposes

0 credit • signature • Criterion requirement module • both semesters semester • recommended semester: 4

Number of hours/semester: 0 lectures + 0 practices + 0 seminars = total of 0 hours
Course headcount limitations (min.-max.): 1 – 400
Prerequisites: no prerequisites

Topic
Exam of Medical Hungarian language skills required for the clinical studies.

Conditions for acceptance of the semester
Mid-term exams
Making up for missed classes

Reading material
- Obligatory literature
- Literature developed by the Department
- Notes
- Recommended literature

Lectures
Practices
Seminars

Exam topics/questions
Participants
**OAR-HUF-W  Final Examination in Medical Hungarian - written**

**Course director:** DR. GÁBOR RÉBÉK-NAGY, associate professor  
Department of Languages for Specific Purposes

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<td><strong>Prerequisites:</strong> no prerequisites</td>
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**Topic**

Exam of Medical Hungarian language skills required for the clinical studies.

**Conditions for acceptance of the semester**

Mid-term exams

Making up for missed classes

**Reading material**

- Obligatory literature
- Literature developed by the Department
- Notes
- Recommended literature

**Lectures**

**Practices**

**Seminars**

Exam topics/questions

Participants
ATT1-2-3-4  Physical Education 1-2-3-4

Course director: TAMÁS TÉCZELY, physical education teacher

| 0 credit • signature • Criterion requirement module • both semesters semester • recommended semester: 1 -2-3-4 |
|---|---|
| Number of hours/semester: | 0 lectures + 28 practices + 0 seminars = total of 28 hours |
| Course headcount limitations (min.-max.): | 2 – 50 |
| Prerequisites: | none / ATT1 / ATT2 / ATT3 |

Number of hours/semester: 0 lectures + 28 practices + 0 seminars = total of 28 hours

Course headcount limitations (min.-max.): 2 – 50

Prerequisites: none / ATT1 / ATT2 / ATT3

Topics

The main goal of the university’s physical education is the development of our students’ health. To prevent injuries, in the introductory part of the sessions warming up of different muscle groups. We are improving the fitness stamina and strength of our students through the sport movements and by using modern training methods. The practice of sport by becoming familiar with the rules of the game. Our task is to incorporate regular physical activity into the lifestyle of the students.

Course type:

Criteria requirement

During the general medical education until the end of the 10th semester, for dentists and pharmacists until the end of the 8 semester the implementation of four semester regular physical activity is obligatory. They have to participate in 28 lessons of physical education on weekly basis. (Two lessons weekly.) Due to fulfilling the requirements they can not enrol for the next semester. The organization, the direction and the control are done by the teachers in charge of the workshops or by persons delegated by the dean of the Medical School. We record the presence of the students. We verify the completion of the semester by confirmation of the registration plate in ETR system.

Conditions for acceptance of the semester:

The minimum requirement for acceptance of the semester is to attend on a ten week session training. During semester 4x45 minutes absence is allowed. Accepting additional 4x45 minutes absence is the competence of the supervisor.

Possible absence:

We provide 6x45 minutes as a catching up time, which should be approved by the teacher. The catch up sessions have to be fulfilled during the last three weeks of semester.

Practices

The selection of the sport movements depends on the chosen game.

Exam questions

The acceptance of the semester is not connected to exam.

PE teachers

Farkas György (FAGMAAO.PTE), Finak Gáborné Gombosi Eszter (FIGMAAT.PTE), Lipcsik Zoltán (LIZIAAT.PTE), Németh Attila (NEAGAET.PTE), Dr. Rugási Endre (RUEMAAP.PTE), Téczely Tamás (PETLAAT.PTE)
<table>
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<tr>
<td>Aerobics</td>
<td>Monday</td>
<td>18.00-19.00</td>
<td>Sörház, 19 Xavér Street</td>
<td>2</td>
<td>8</td>
<td>Dr. Szilárdné Kordély Erika</td>
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<tr>
<td>Aerobics</td>
<td>Tuesday</td>
<td>19.00-20.00</td>
<td>training room, 12 Szigeti Street</td>
<td>2</td>
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<td>Juhász Petra</td>
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<tr>
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<td>Wednesday</td>
<td>18.00-19.00</td>
<td>Sörház, 19 Xavér Street</td>
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<td>Dr. Szilárdné Kordély Erika</td>
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<tr>
<td>Aerobics</td>
<td>Wednesday</td>
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<tr>
<td>Aerobics</td>
<td>Thursday</td>
<td>19.00-20.00</td>
<td>Professor’s Gym, 4 Megyeri Road</td>
<td>2</td>
<td>10</td>
<td>Dr. Szilárdné Kordély Erika</td>
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<td>Aerobics pom pom</td>
<td>Thursday</td>
<td>19.00-20.30</td>
<td>Sörház, 19 Xavér Street</td>
<td>2</td>
<td>6</td>
<td>Rill Leila</td>
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<tr>
<td>Badminton</td>
<td>Thursday</td>
<td>16.30-18.00</td>
<td>sports hall, 6 Jakabhegyi Road</td>
<td>2</td>
<td>7</td>
<td>Lipszí Zoltán</td>
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<tr>
<td>Basketball (men)</td>
<td>Thursday</td>
<td>22.00-23.30</td>
<td>sports hall, 6 Jakabhegyi Road</td>
<td>4</td>
<td>20</td>
<td>Németh Attila</td>
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<tr>
<td>Basketball (women)</td>
<td>Wednesday</td>
<td>18.00-19.30</td>
<td>sports hall, 6 Jakabhegyi Road</td>
<td>2</td>
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<td>Németh Attila</td>
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<tr>
<td>Box</td>
<td>Thursday</td>
<td>18.00 -19.00</td>
<td>Sziiven Ring&amp;Caffe, 1 Mezősőzé Street</td>
<td>2</td>
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<td>Szegedi Szilár</td>
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<td>Cardio Yoga</td>
<td>Friday</td>
<td>15.00-16.30</td>
<td>training room, 12 Szigeti Street</td>
<td>2</td>
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<td>Ragács Renáta</td>
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<tr>
<td>Climbing</td>
<td>Thursday</td>
<td>17.00-18.30</td>
<td>Pécsi Sasok Fitness Center, 6/b Búza Square</td>
<td>2</td>
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<td>Téczely Tamás</td>
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<tr>
<td>Cycling</td>
<td>Weekends</td>
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<td>outdoor basketball courts, Jakabhegyi Road</td>
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<td>Dr. Karsai István</td>
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<tr>
<td>Dancing University Project</td>
<td>Monday</td>
<td>17.00-18.30</td>
<td>dance and movement hall, 6 Ifjúság Road</td>
<td>1</td>
<td>4</td>
<td>Szabó Adrienn</td>
<td>Perjés Be</td>
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<tr>
<td>Latin freestyle aerobics</td>
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<td>Dancing University Project</td>
<td>Thursday</td>
<td>16.00.-17.30</td>
<td>dance and movement hall, 6 Ifjúság Road</td>
<td>1</td>
<td>4</td>
<td>Szabó Adrienn</td>
<td>Perjés Be</td>
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<td>Latin freestyle aerobics</td>
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<td>Dancing University Project</td>
<td>Monday</td>
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<td>dance and movement hall, 6 Ifjúság Road</td>
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<td>4</td>
<td>Szauer Zoltán</td>
<td>Perjés Be</td>
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<tr>
<td>Boogie woogie-rock and roll-swing</td>
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<td>Dancing University Project</td>
<td>Tuesday</td>
<td>17.30-19.00</td>
<td>dance and movement hall, 6 Ifjúság Road</td>
<td>1</td>
<td>4</td>
<td>Vélin Veszna</td>
<td>Perjés Be</td>
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<tr>
<td>Croatian, Serbian and Macedonian Dances</td>
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<td>Wednesday</td>
<td>17.00-18.30</td>
<td>dance and movement hall, 6 Ifjúság Road</td>
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<td>Vágási Barbara, Kutni Balázs</td>
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<td>Cuban Salsa</td>
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<td>Monday</td>
<td>18.30-20.00</td>
<td>dance and movement hall, 6 Ifjúság Road</td>
<td>1</td>
<td>4</td>
<td>Horváth Tamás</td>
<td>Perjés Be</td>
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<tr>
<td>Hip-hop</td>
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<td>Tuesday</td>
<td>16.00-17.30</td>
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<td>Szuhan-Glass Beáta</td>
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<td>Body Shaping Dance Aerobics</td>
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<td>Tuesday</td>
<td>20.30-22.00</td>
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<td>1</td>
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<td>Józsa János</td>
<td>Perjés Be</td>
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<td>Ballrum Latin Dances</td>
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<td>Wednesday</td>
<td>18.30-20.00</td>
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<td>Indzsi Deniz</td>
<td>Perjés Be</td>
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<td>Belly Dance</td>
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<td>course</td>
<td>day</td>
<td>time</td>
<td>place</td>
<td>mini</td>
<td>maxi</td>
<td>teacher</td>
<td>Students Sports Assoc.</td>
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<tr>
<td>Football</td>
<td>Friday</td>
<td>13.30-15.00</td>
<td>sports hall, 6 Jakabhegyi Road</td>
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<td>15</td>
<td>Téczely Tamás</td>
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<td>Football</td>
<td>Friday</td>
<td>15.00-16.30</td>
<td>sports hall, 6 Jakabhegyi Road</td>
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<tr>
<td>Football (women)</td>
<td>Tuesday</td>
<td>18.00-19.30</td>
<td>13 Verseny Street</td>
<td>2</td>
<td>12</td>
<td>Téczely Tamás Victoria Fossberg</td>
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<td>Gliding</td>
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<td>Téczely Tamás</td>
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<tr>
<td>Handball (men)</td>
<td>Wednesday</td>
<td>19.30-21.00</td>
<td>sports hall, 6 Jakabhegyi Road</td>
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<td>7</td>
<td>Lipszic Zoltán Farkas György</td>
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<td>Handball (women)</td>
<td>Monday</td>
<td>17.30-19.00</td>
<td>sports hall, 6 Jakabhegyi Road</td>
<td>2</td>
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<td>Lipszic Zoltán Farkas György</td>
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<td>Hiking</td>
<td>Weekends</td>
<td>9.00-15.00</td>
<td>Mecsek</td>
<td>2</td>
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<td>Farkas György</td>
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<td>Horse Riding</td>
<td>Wednesday</td>
<td>17.00-18.30</td>
<td>1 Sport Street</td>
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<td>Téczely Tamás</td>
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<tr>
<td>Karate advanced</td>
<td>Thursday</td>
<td>20.00-21.30</td>
<td>training room, 12 Szegedti Street</td>
<td>2</td>
<td>7</td>
<td>József Kristóf Farkas György</td>
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<tr>
<td>Karate beginner</td>
<td>Tuesday</td>
<td>20.00-21.30</td>
<td>training room, 12 Szegedti Street</td>
<td>2</td>
<td>7</td>
<td>József Kristóf Farkas György</td>
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<tr>
<td>Kick-box</td>
<td>Friday</td>
<td>19.00-20.30</td>
<td>training room, 12 Szegedti Street</td>
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<td>12</td>
<td>Horváth László</td>
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<td>Lacross</td>
<td>Thursday</td>
<td>17.00-18.30</td>
<td>13 Verseny Street</td>
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<td>Dr. Rugási Endre</td>
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<td>Lightathletic training (jogging)</td>
<td>Monday</td>
<td>18.00-19.30</td>
<td>outdoor basketball courts, Jakabhegyi Road</td>
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<td>Dr. Karsai István</td>
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<tr>
<td>Other Sport Club from Pécs (with permission)</td>
<td>Wednesday</td>
<td>15.00-16.30</td>
<td>Sórház, 19 Xavér Street</td>
<td>1</td>
<td>2</td>
<td>Németh Attila</td>
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<tr>
<td>Other Sport Club from Pécs (with permission)</td>
<td>Wednesday</td>
<td>16.30-18.00</td>
<td>Sórház, 19 Xavér Street</td>
<td>1</td>
<td>2</td>
<td>Németh Attila</td>
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<tr>
<td>Other Sport Club from Pécs (with permission)</td>
<td>Friday</td>
<td>16.30-18.00</td>
<td>Sórház, 19 Xavér Street</td>
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<td>Téczely Tamás</td>
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<tr>
<td>PEAC Sport Club (with permission)</td>
<td>Wednesday</td>
<td>15.00-16.30</td>
<td>Sórház, 19 Xavér Street</td>
<td>2</td>
<td>20</td>
<td>Téczely Tamás</td>
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<tr>
<td>Squash</td>
<td>Wednesday</td>
<td>15.00-16.00</td>
<td>Sórház, 19 Xavér Street</td>
<td>1</td>
<td>2</td>
<td>Németh Attila</td>
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<tr>
<td>Squash</td>
<td>Wednesday</td>
<td>16.30-18.00</td>
<td>Sórház, 19 Xavér Street</td>
<td>1</td>
<td>2</td>
<td>Németh Attila</td>
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<tr>
<td>Squash</td>
<td>Friday</td>
<td>16.30-18.00</td>
<td>Sórház, 19 Xavér Street</td>
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<td>4</td>
<td>Téczely Tamás</td>
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<tr>
<td>Swimming</td>
<td>Friday</td>
<td>13.30-15.00</td>
<td>swimming pool, 12 Szegedti Street</td>
<td>3</td>
<td>15</td>
<td>Farkas György</td>
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<tr>
<td>Swimming</td>
<td>Friday</td>
<td>15.00-16.00</td>
<td>swimming pool, 12 Szegedti Street</td>
<td>3</td>
<td>15</td>
<td>Finak Gaborné Gombosi Eszter</td>
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<tr>
<td>Table Tennis</td>
<td>Thursday</td>
<td>13.30-15.00</td>
<td>training room, 12 Szegedti Street</td>
<td>4</td>
<td>16</td>
<td>Finak Gaborné Gombosi Eszter</td>
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<tr>
<td>Table Tennis</td>
<td>Thursday</td>
<td>15.00-16.15</td>
<td>training room, 12 Szegedti Street</td>
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<td>16</td>
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<td>Table Tennis</td>
<td>Friday</td>
<td>13.30-15.00</td>
<td>training room, 12 Szegedti Street</td>
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<td>Finak Gaborné Gombosi Eszter</td>
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<td>Tennis</td>
<td>Thursday</td>
<td>19.00-20.00</td>
<td>Makár Tanya, 4 Középmakár dülő</td>
<td>2</td>
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<td>Daróczi Balázs</td>
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<td>Training in the Gym</td>
<td>Wednesday</td>
<td>12.00-13.30</td>
<td>Professor’s Gym, 4 Megyeri Road</td>
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<td>Lipszic Zoltán</td>
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<td>Training in the Gym</td>
<td>Friday</td>
<td>12.00-13.30</td>
<td>Professor’s Gym, 4 Megyeri Road</td>
<td>4</td>
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<td>Lipszic Zoltán</td>
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<tr>
<td>Training in the Gym</td>
<td>Friday</td>
<td>13.30-15.00</td>
<td>Professor’s Gym, 4 Megyeri Road</td>
<td>4</td>
<td>20</td>
<td>Németh Attila</td>
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<tr>
<td>course</td>
<td>day</td>
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<td>place</td>
<td>mini</td>
<td>maxi</td>
<td>teacher</td>
<td>Students</td>
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<tr>
<td>Volleyball (men)</td>
<td>Wednesday</td>
<td>16.30-18.00</td>
<td>sports hall, 6 Jakabhegyi Road</td>
<td>2</td>
<td>7</td>
<td>Storcz Tamás</td>
<td>Farkas György</td>
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<tr>
<td>Volleyball (women)</td>
<td>Tuesday</td>
<td>16.30-18.00</td>
<td>sports hall, 6 Jakabhegyi Road</td>
<td>2</td>
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<td>Demeter András</td>
<td>Farkas György</td>
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<td>XCO training</td>
<td>Thursday</td>
<td>19.00-20.00</td>
<td>Mecsek Fittness, 10 Ybl Miklós Street</td>
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<td>Szőke Zita</td>
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<td>Yoga</td>
<td>Saturday</td>
<td>18.00 - 20.00</td>
<td>Sőrház, 19 Xavér Street</td>
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<td>10</td>
<td>Briest Charlotte</td>
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<td>Zumba (fee payment necessary)</td>
<td>Wednesday</td>
<td>18.00-19.00</td>
<td>Fordan Dance Center, 9/b. Batthyányi Street</td>
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<td>Varga Zsuzsanna</td>
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